ROADS AND STREETS

May, 1960

A GILLETTE PUBLICATION

UNIVERSITY MICROFILMS
EUGENE B. POWER
313 N. 1ST. ST.
ANN ARBOR, MICH.

Slip Form Pavers Hit Stride in California page 78

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4 WAYS TO BETTER PAVING PROFITS

① JACKSON VIBRATORY COMPACTOR
On any major paving project involving the compaction of granular soils, from sand to large rock, or soil-cement mixes the JACKSON MULTIPLE VIBRATORY COMPACTOR will save its cost in jig time. It's faster in attaining 100% specified density, more economical to operate and maintain, and has far greater job adaptability than any other machine. Vibratory units can be arranged to exactly fit the job — individual units manually operated to reach the otherwise inaccessible spots. The machine operates in either direction — no turning required; and each vibratory unit supplies 4200 3-TON BLOWS per minute.

② JACKSON TRAILER COMPACTOR Employs the same vibratory units as the MULTIPLE (up to 6 in a single workhead, or 8 in two). May be pushed or pulled by any prime mover capable of working speeds as low as 50 FPM. Power plant supplies both single and 3-phase, 110-115 Volt, 60 Cycle, AC, and has many uses.

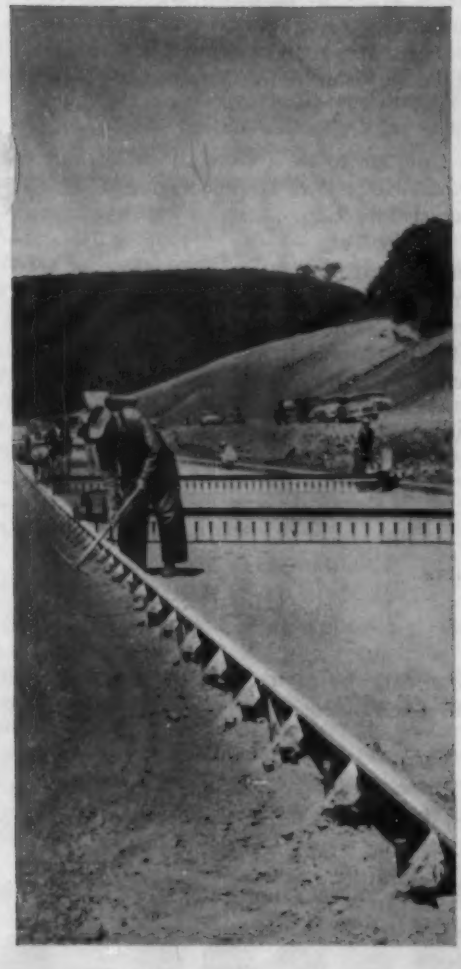
③ JACKSON MANUAL COMPACTOR Uses same vibratory unit as the MULTIPLE COMPACTOR. It's self-propelling, achieves 100% specified density of granular soil in 5" layers at rate of 400 sq. yds. per hour. One man can easily handle hook-up of twin units and double production. Trailer-mounted generator with compactor pick-up feature for universal operation is available. Perfect for a host of applications.

④ MUNICIPAL PAVING For jobs of this type, a JACKSON Vibratory Screed and Portable Power Plant is a very convenient, productive and inexpensive outfit. Strikes off to any crown, undercuts at curbs and side-forms, works right up to and around all obstructions. Two men easily handle it on all slabs up to 30 ft. wide. Rolls back for second passes on 4 rollers.

FOR SALE OR RENT AT YOUR NEARBY JACKSON DISTRIBUTOR
Name and literature on request.

JACKSON VIBRATORS, INC.
LUDINGTON, MICHIGAN

Paving the Penn-Can Highway



Welcome addition to Pennsylvania's fast-growing system of superhighways is the new Penn-Can Highway, stretching from Stroudsburg north to the New York State line near Binghamton.

Part of the Interstate Highway System, the new road will be concrete, generally four lanes wide, with a 60-ft median strip.

Shown here is the Lycoming Construction Co., Inc. of Williamsport, Pa., paving a section of the Penn-Can Highway near New Milford. A number of Bethlehem steel products for highways were used in constructing this section, including reinforcing steel for pavements and structures, dowel units, hook bolts, guard rail posts, cable guard rail, beam guard rail, and wire rope.

Single Source for Highway Steels

Bethlehem supplies the largest line of steel highway products in the country. Beginning with steels for the right-of-way, on through steel products for drainage systems, bridges, tunnels, road-paving, and bridge and highway guard rails, you can get all your highway steel products from one source—Bethlehem.

Write or phone the nearest Bethlehem sales office for full details. No obligation to you, of course.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

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BIDS DON'T BACKFIRE

because of tire troubles... with Goodyear on the job

FINDING THE WORK FACTORS—Goodyear Big-Tire Specialists will analyze the problems of terrain, loads, climate, roads, schedules, speeds—everything that bears on tire needs and costs.

Then, from a complete line of *the world's toughest earthmover tires*, they'll recommend the most efficient and lowest-cost tire to do each job right. These tires, with a super-tough body built with 3-T Nylon Cord and specially compounded tread rubbers of unequaled toughness, cope with tremendous loads, endless flexing, cutting and chipping dangers—provide amazing durability.

PUTTING BIG-TIRE KNOW-HOW TO WORK—From the world's greatest fund of experience, Goodyear Big-Tire Specialists are uniquely qualified to help you. And they'll provide the best in tread and body designs to help safeguard your contract and your profits.

SETTING UP BIG-TIRE SERVICE—Goodyear Big-Tire Specialists will complete your tire-performance insurance by lining up, and even operating, a tire-maintenance program to save you BIG MONEY in man-hours, machine-hours and useful tire life. If necessary, Goodyear contractor service will travel with your job—handle all your tire maintenance and repairs.

With BIG TIRE PERFORMANCE
Example: SUPER HARD ROCK LUG

Here's a typical Goodyear big tire for big jobs—the new Super Hard Rock Lug (pictured). This wide-base off-roader has a new "square" shoulder design with extra-thick rubber for terrific traction bite and longer wear. Yet its cost is the same as ordinary wide-base tires.

Get in on all this—see your Goodyear dealer now! Or write Goodyear, Truck Tire Dept., Akron 16, Ohio.

WORLD'S TOUGHEST EARTHMOVER TIRES BY

GOODYEAR

MORE TONS ARE HAULED ON GOODYEAR TRUCK TIRES THAN ON ANY OTHER KIND

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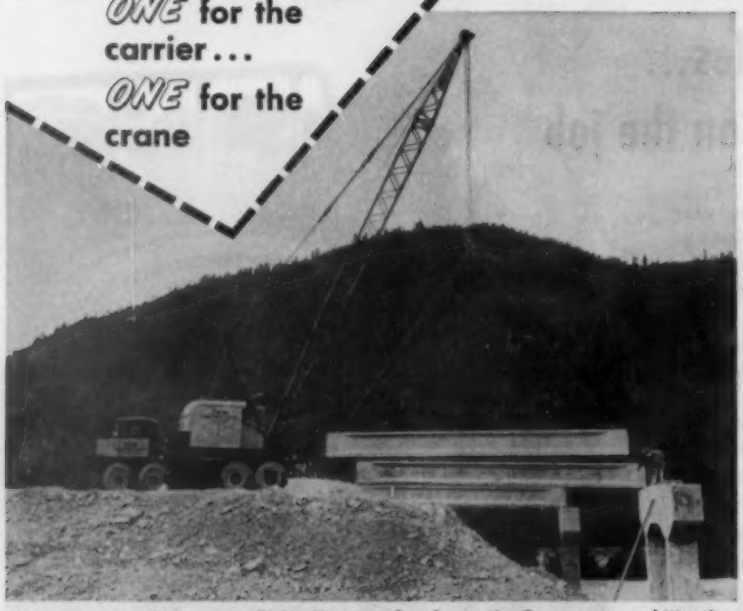
TWO
WAUKESHA
ENGINES

ONE for the carrier...
ONE for the crane



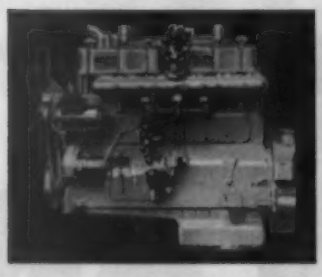
On new interstate highway near Tarkio, Montana—Pew Construction Co., contractors, of Missoula, Montana, are building overpasses for the Montana Highway Department, using an MC-530W Lorain truck-crane with two Waukesha Engines.

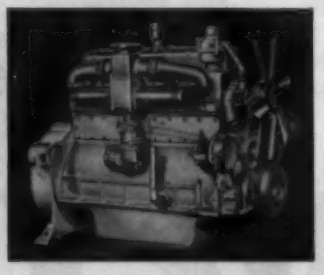
Setting prestressed concrete beams—40 to 45 ft. long, weighing 10½ to 12½ tons each — constructing highway-over-highway overpasses! And, lifting these beams on a radius of 32 ft., with a 65 ft. beam, the Lorain truck-crane did the job handily. Its crane engine, a Waukesha gasoline 135-GZB, has the sheer lifting power, and the quickly responsive, smooth power for maneuvering, with reserve power when needed. The carrier engine, a Waukesha gasoline 145-GKB, "has lots of power for the road" says the crane operator.

Send for Engine Bulletins.

Powering the Carrier—145-GKB Waukesha Gasoline, 5¼-in bore x 6-in. stroke, 779 cu. in. displacement. Max. hp 240 @ 2400 rpm.

Powering Crane (boom) 135-GZB Waukesha Gasoline, 4⅜-in. bore x 5-in. stroke, 451 cu. in. displacement. Max. hp 153 @ 2800 rpm.





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CATERPILLAR

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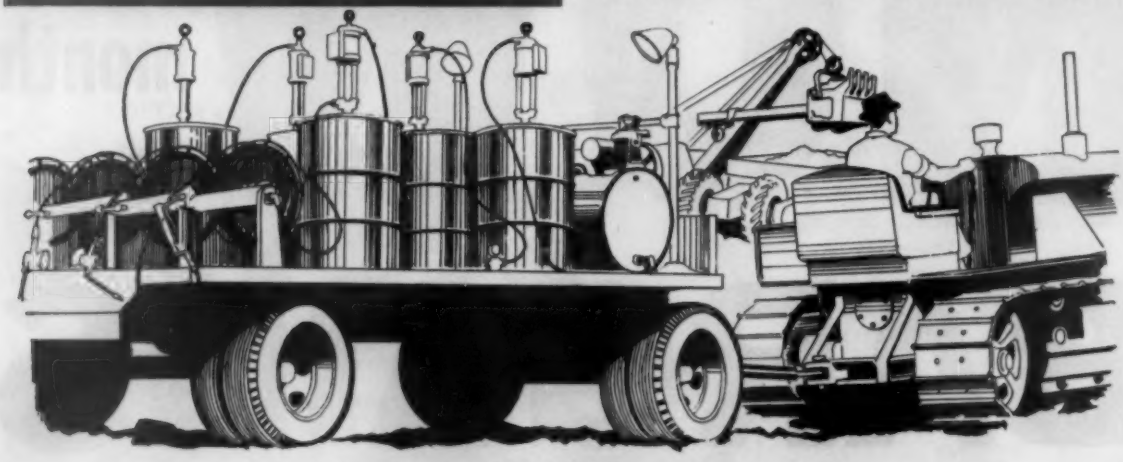
LUBE LOGIC Tips for more



Do-it-yourself lube rig trailer

Maybe you're aware of all the advantages of a mobile lube rig, but just don't want to tie up a truck for this purpose. Or, perhaps you'd like a supplementary rig. You can solve either problem neatly by mounting your field lubricating equipment on a standard 5-ton farm trailer. That way, you can take your whole simplified lube plan out into the field where it's needed, without costly deadheading back to a fixed service point—and you can move the lube rig just by hitching it to any truck, so it's just as mobile as a truck mounted rig at much less cost. And here's a bonus: by hitching your lube rig trailer to a bulldozer, you can take field service to spots that wouldn't be accessible to a regular truck.

Trailers for this purpose, as well as tanks and pumps, are all standard items you assemble yourself to meet your own requirements.

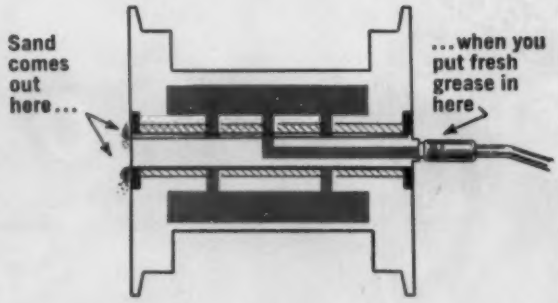
TEXACO LUBRICATION ENGINEERS ON THE JOB FROM COAST TO COAST

ROCKY REACH DAM AND POWERHOUSE on the Columbia River, Washington (above). W. N. Evans (left), Manager for Rocky Reach Contractors, discusses Simplified Lubrication Plan with E. S. Saunders, Texaco Contractor Sales Representative.

HOGBACK DAM, Riverton, Conn., (upper right) is part of the greater Hartford water supply system. Texaco man-on-the-job is H. F. Porter (left) shown with John Toffolon, Vice President, White Oak Contractors, Inc., General Contractors.

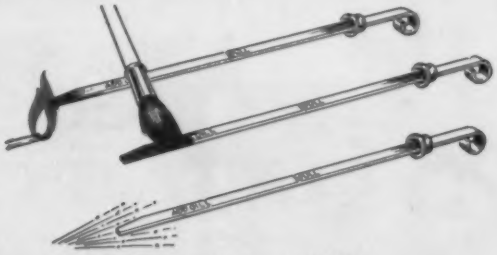
INTERSTATE HIGHWAY 80 PROJECT at Colfax, Iowa (right). Texaco Engineer E. A. Howles (right) works closely with Mott Construction Company on the important assignment of keeping equipment on the job and maintenance costs low.

efficient maintenance



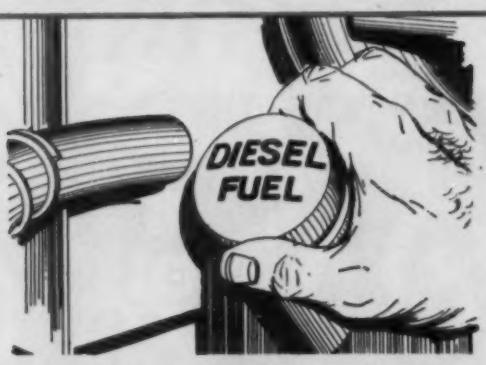
Track-roll enemy No. 1: sand

If you're operating a crawler-tractor in sandy soil, the best way to keep sand from getting into the track-roll bearings is to keep purging the bearings with fresh grease. Track-roll bearing seals are especially designed for this type of purge-lubrication, and the grease that comes out around the edges of the seal during lubrication carries the sand out with it.



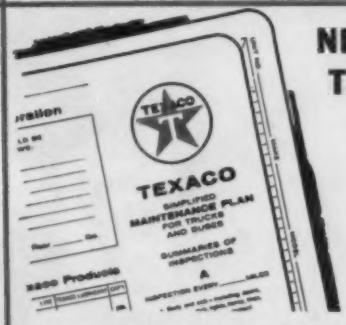
How to read dipsticks without squinting

The modern inhibited motor oil that keeps the inside of your engine clean also keeps the oil dipstick clean—and often too shiny to read. Here are three solutions for this problem—take your choice. 1. Heat the end of the dipstick so the metal darkens slightly. 2. Paint the end of the stick with a dull-finish cellulose lacquer. 3. Run the stick across the spark-plug cleaner to take off some of the shine. (If you use the spark plug cleaner, use the smallest rubber plug bushing and hold the dipstick over the hole with a wad of cloth to keep sand from scattering around the lube bay.)



Identify the fuel you want

Let one absent-minded maintenance man put gasoline in your diesel tank and as the fliers say "you'll be bailing out over Denver." It's happened. Best way to avoid its happening to *you* is to mark your fill cap "Diesel Fuel" or "Gasoline". Then nobody should make any mistakes.



NEW TRUCK RECORD FOLDER fits itself into your schedule

Texaco's flexible new truck record folder lets you stick to the lube schedule that works best for you without running into bookkeeping problems. Lubrication and oil schedules are completely separate from mechanical maintenance and replacement parts schedule—you don't have to follow any pre-established routine to use the folder profitably. And this new folder accounts for every single dollar you spend on truck maintenance for a whole year. Write for your folders today.

TEXACO LUBRICATION ENGINEERS

Every month we'll bring you a batch of "sleepers", little angles, so easy to overlook, where big savings in money and time can be made. But month in, month out, your local Texaco Lubrication Engineer is the best source of money-saving lubrication ideas. Don't forget that "Lubrication is a major factor in cost control."

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360
MOTOR SCRAPER
ALLIS-CHALMERS

GET POSITIVE PENETRATION AT CUTTING EDGE

The new, all-hydraulic TS-360 is the only motor scraper in the 30-yd class with double-acting bowl jacks that provide 2-way power for faster loading, more cutting control.

The TS-360's exclusive hydraulic down pressure penetrates quickly into the toughest-loading materials. Penetrating force like this—along with Allis-Chalmers original low, wide bowl—gives you fast, heaped loads every pass.

Slope-cutting is another good example! "Cornering-in" with bowl down pressure lets your operator sink his bit *when* and *where he wants* . . . lets him maintain the best cutting depth while loading. The result: Clean, accurate slopes.

Positive penetration is only one reason you'll get top performance on any size job. *Two-stage steering—forced ejection and highest apron lift—90° steer and* KON-TORK *differential* are earth-moving advantages you cannot afford to overlook.

Put this new 340-hp TS-360 to work for you. Move more dirt per dollar invested than ever before. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wisconsin.

KON-TORK is an Allis-Chalmers trademark.

move ahead with

ALLIS-CHALMERS

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FIRESTONE TIRES LOWER OPERATING COSTS!

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ALWAYS SPECIFY FIRESTONE TIRES WHEN ORDERING NEW EQUIPMENT

Super Rock Grip Wide Base* Super Rock Grip Deep Tread*

TUBELESS OR TUBED

Firestone

BETTER RUBBER FROM START TO FINISH

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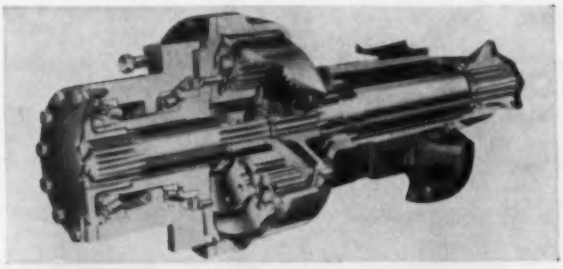
*Firestone T.M.

It's a real lugger!

...new International® 660 Diesel

Put the 660's 74 drawbar hp* to work and free your big earthmoving tractors for larger, more profitable assignments! The new, direct-start, smooth-running six-cylinder Diesel delivers *more than 11,000 pounds of pull*, with adequate weight for traction.

Over 4½ tons of built-in brawn give the 660 the stamina for continuous heavy-duty operation. Yet, with power steering, operators handle this giant tractor with single-handed ease. Equipped with optional Torque Amplifier drive, the powerful 660 provides 10 speeds forward, 1.5 to 16.5 mph. In any gear, a touch on the TA foot control lets the operator boost pull-power up to 45%, *on-the-go*, without shifting...Also available with Multi-Range, 6-cylinder gasoline or LPG engine.



First new big tractor drive in 10 years!

A new and exclusive planetary gear system makes the final speed reduction at the wheel hub . . . axles are completely free-floating. Thus, tractor weight, shock loads from uneven terrain, and heavy drawbar pulls are carried by the hefty final drive housings, *not* on the axles.

Take a good look at your equipment fleet and add up the number of jobs you could handle more economically with the International 660's rubber-tired speed and lower operating costs. Then, visit your International Harvester dealer, headquarters for the construction industry's most complete line of tractors . . . six power sizes on wheels, 13.4 to 95 maximum flywheel hp*. Ask for a demonstration of the tractor to match your needs.

**Corrected to standard sea level conditions.*

See your INTERNATIONAL HARVESTER dealer

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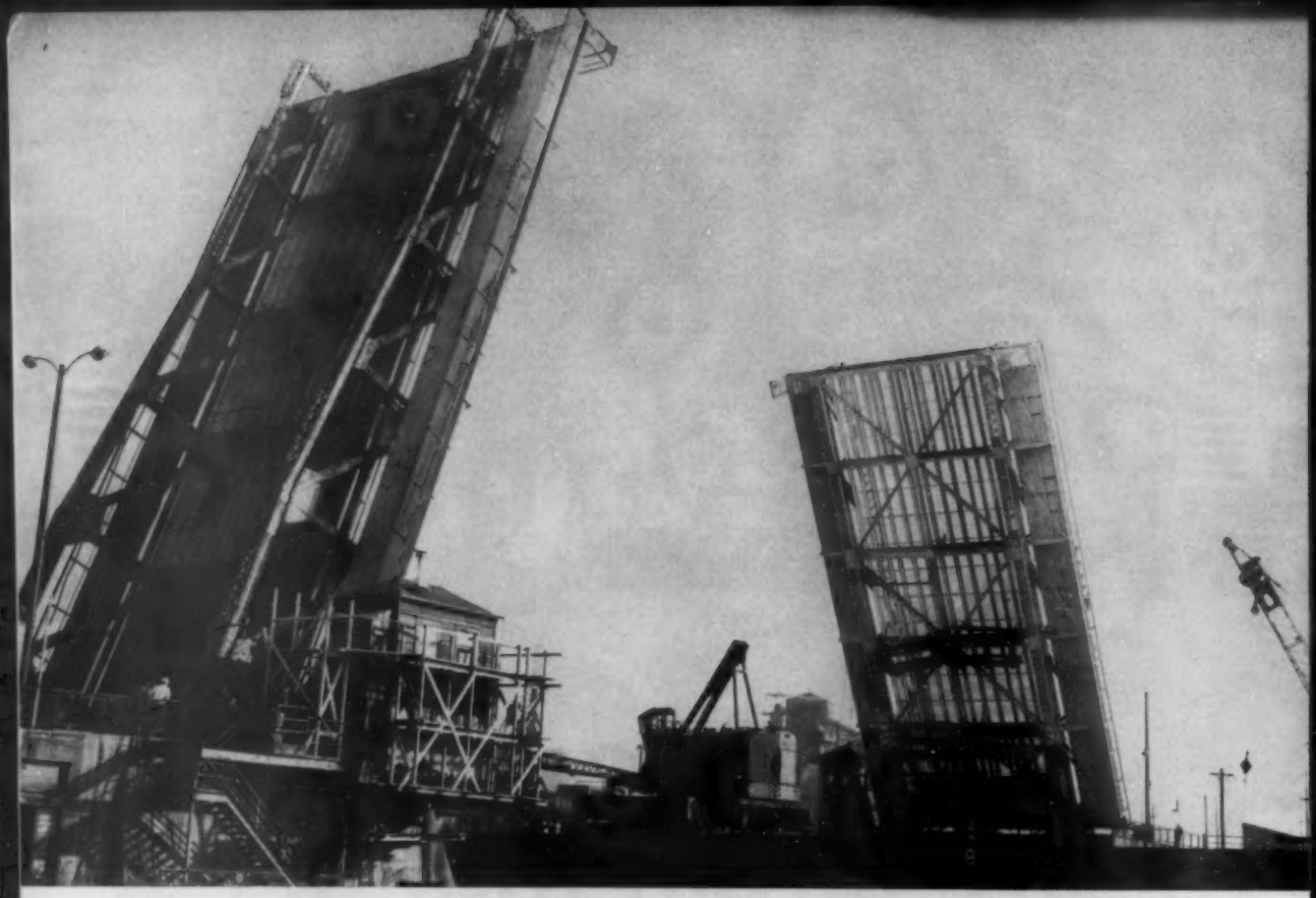

How to add 20 years to the life of a bridge

USS AmBridge Highway Beam Guard Rail and Posts help safeguard traffic. This rugged, flexible steel beam guard rail is highly visible. It bolts easily but firmly to steel posts and is available in 25′ lengths to minimize splicing.

USS AmBridge Sectional Plate is perfect for drainage structures or underground passageways. It won't crack. Won't break. It's easy to install, because there's no need for forms. AmBridge Sectional Plate comes in a complete range of sizes.

Chicago's 92nd street bridge was built in 1914. It's a bascule bridge that averages 5,000 openings a year. Local engineers call it the city's busiest bridge. Mr. S. J. Michuda, Chicago's Chief Bridge Engineer, recently included the 92nd street bridge in his program to redeck the city's deteriorated movable bridges with steel grid flooring. ☐ Mr. Michuda tells why: "Steel re-decking adds twenty years to the life of a bridge, and cuts maintenance costs to the bone. Steel grid is strong and durable . . . it's able to take the brutal pounding of heavy traffic. ☐ "For instance," says the Chief Engineer, "snow chains pepper our ancient bridges like shotgun pellets during the winter months. But, there's no problem with steel grid flooring. It can't break up." ☐ Steel grid flooring greatly reduces dead load—permits a bridge to handle heavier vehicles. USS AmBridge I-Beam-Lok is a sturdy, lightweight bridge flooring. It installs easily and quickly with few traffic interruptions. The filled type is available in units 6′ wide and up to 49′ long, that apply directly to stringers on spans from 6′ up to 8′ centers. The open type is also available for spans up to 4′ center. ☐ For specific information, write to our Pittsburgh Office. We'll send you a copy of our 32-page catalog.

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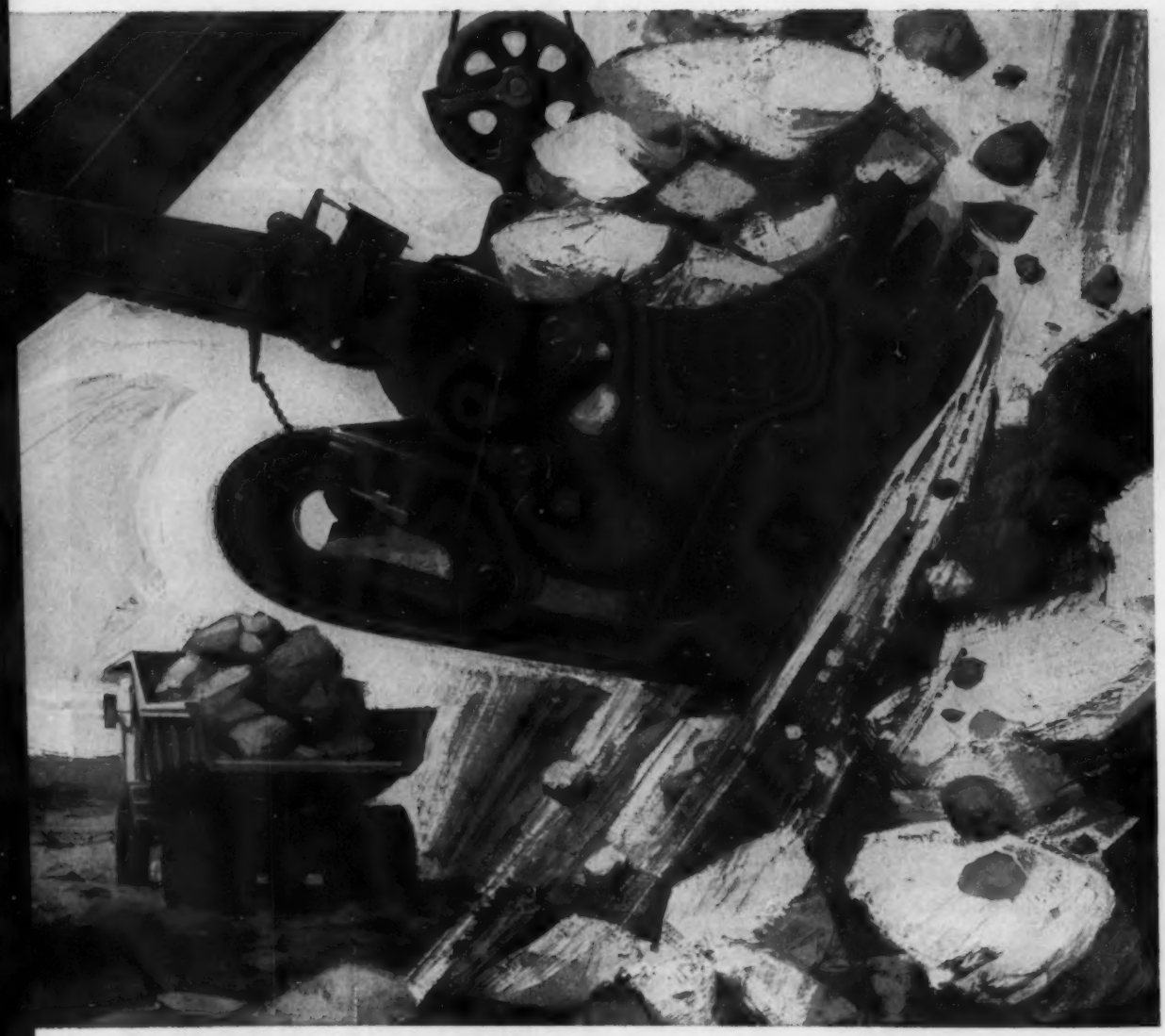
USS

TANK-TOUGH LINK-BELT SPEEDERS...

treat rock like dirt!



All-welded and stress-relieved—stamina, strength and guts to shrug off years of hard work! Tough, impact-loving Link-Belt Speeders thrive on the roughness of rock. They're built for rugged duty with all-welded, stress-relieved, jig-bored frame assemblies. Precision boring permits parts interchangeability, steps up machinery strength under stress. Extra-size, heat-treated machine components transmit more of rated hp to swing, hoist, travel, slam the dipper in. All-welded shovel-booms and dipper sticks . . . all-manganese buckets soak up strains without a shudder. Shafts, gears, bearings are precision aligned, stay aligned. No shims needed. Clutches are self-compensating for heat and normal lining wear.

Split-second Speed-o-Matic controls cut operator fatigue—power steer and more usable hp spurt rock output! Nudge a Speed-o-Matic power hydraulic control lever. Feel this brute obey! Trigger-fast shovel reflexes produce up to 25% more cycles per 8-hour shift. And finger-tip Speed-o-Matic power steering gives you double-quick maneuverability in, out, around blast rock, crusher or truck. No sloppy mechanical wear and repair. Payoff: top-profit rock production for *years* . . . at rock-bottom cost. For information on the complete line of shovels and cranes (½- to 3-yd., 8- to 75-ton capacities), see your distributor or write LINK-BELT SPEEDER CORPORATION, Cedar Rapids, Iowa. 101-60-N

LINK-BELT SPEEDER

It's time to compare . . . with Link-Belt Speeder

. . . for more details circle 343 on enclosed return postal card

Digs 25 fpm, has 30 digging speeds... 10 Timken® bearings keep it digging

This Parsons Model 150 Trenchliner digs fast—25 fpm. It digs deep—5′9″. It digs wide—26″. And it has 30 digging speeds to suit soil conditions. With transmission shafts mounted on Timken® tapered roller bearings, gears and shafts are kept aligned under heaviest-duty conditions. Maintenance is reduced. Digging goes steadily.

For more than 40 years, construction equipment builders have used Timken tapered roller bearings because: 1) The taper lets Timken bearings take heavy radial and thrust loads in *any* combination. 2) By holding shafts concentric with housings, Timken bearings make closures more effective in keeping lubricant *in*, dirt, dust and moisture *out*. 3) The extra load carrying ability of Timken bearings takes care of the rugged going and provides longer life.

TIME-AND-MONEY-SAVING ENGINEERING SERVICE. Often our graduate engineer salemen can solve your bearing problems on the spot, help you design the most economical applications.

WEATHER CONTROL "LAB". We test bearing performance under all conditions of operation, including temperatures as low as −60° F. to make sure Timken bearings roll the loads anywhere and in any weather.

BETTER-NESS rolls on

TIMKEN®

tapered roller bearings

The Timken Roller Bearing Company, Canton 6, Ohio. Cable: "TIMROSCO". *Makers of Tapered Roller Bearings, Fine Alloy Steel and Removable Rock Bits.*

. . . for more details circle 371 on enclosed return postal card

ROADS AND STREETS
Sixty-Six Years of Editorial Leadership

Washington News Letter

By Duane L. Cronk, Director, Highway Information Services, Inc.

May 10, 1960

The Bureau of Public Roads is tightening up a number of regulations affecting contractors in its memorandum series this month. For examples:

- The BPR will insist on the right to approve a state highway department's rejection of a bid. States sometimes reject bids for political and other reasons with which the agency cannot sympathize, and officials feel they must have a voice in approving a rejection as well as an award where federal funds are involved.

- The Bureau is going to require that right-of-way acquisition be completed before a project is advertised. There are too many cases of contractors being held up after having started work while right-of-way agents scramble to pick up the "hold-outs."

- Licensing will not be permitted to serve as a device to restrict bidding. The BPR will insist that states discontinue the practice of requiring contractors to be licensed in a state before they can bid. This artificial ban against out-of-state roadbuilders must be abandoned, BPR says.

- Field inspection measures will be tightened, better testing of materials will be the order of the day, and other quality control methods enforced. Field engineers will be permitted to make more decisions on the spot.

- Effective this month, proposed federal-aid projects must be advertised three weeks in advance of the letting instead of two, giving contractors more time to estimate their costs.

The ensuing "red tape" will prove odious to state highway engineers, BPR officials are aware, and will undoubtedly add to the administrative and supervisory burden of some departments. However, Bureau leaders feel the National Highway Program will be increasingly subjected to public investigation and wants to avoid criticism.

* * *

The first comprehensive survey of the highway contracting industry by the Bureau of Public Roads is being run through the agency's IBM machines this month. Preliminary figures indicate that nearly 10,000 firms are prequalified by the state highway departments to bid on road projects. (This does not include a large number of subs which are not prequalified in most states.)

The BPR will refine its statistics for greater usefulness to equipment and materials producers and, in time, indicate the size range of jobs which contractors seek, their specialization, and other data.

(continued on next page)

Consulting engineers are striking back at charges by the General Accounting Office that highway departments are not doing enough of the location and design job internally. (It is interesting to note how many states, hearing themselves told that it is "wasteful" to contract such work to private enterprise, have found plenty of data to justify this procedure.)

The National Society of Professional Engineers reported last month that design fees on 1,464 engineering contracts came to less than 3%, and that inspection service fees on 93 recent projects amount to only 2.19%. These were some of the findings from a survey of $4.3 billion worth of construction awarded by 17 different government agencies and bureaus. A break-away of highway and bridge contracts reveals that consultants completed work in this exacting field for far less than is usually assumed. Consultants furnished designs for 3.55% and inspection services for only 3.25%.

Some highway departments (a very few) have turned highway engineering into almost solely a civil service occupation. Consultants charge that, in order to maintain large organizations of men under their administration, officials have been guilty of minimizing their own engineering costs and exaggerating the cost to obtain the services of consulting firms. The NSPE survey is a much belated attempt to establish the facts.

* * *

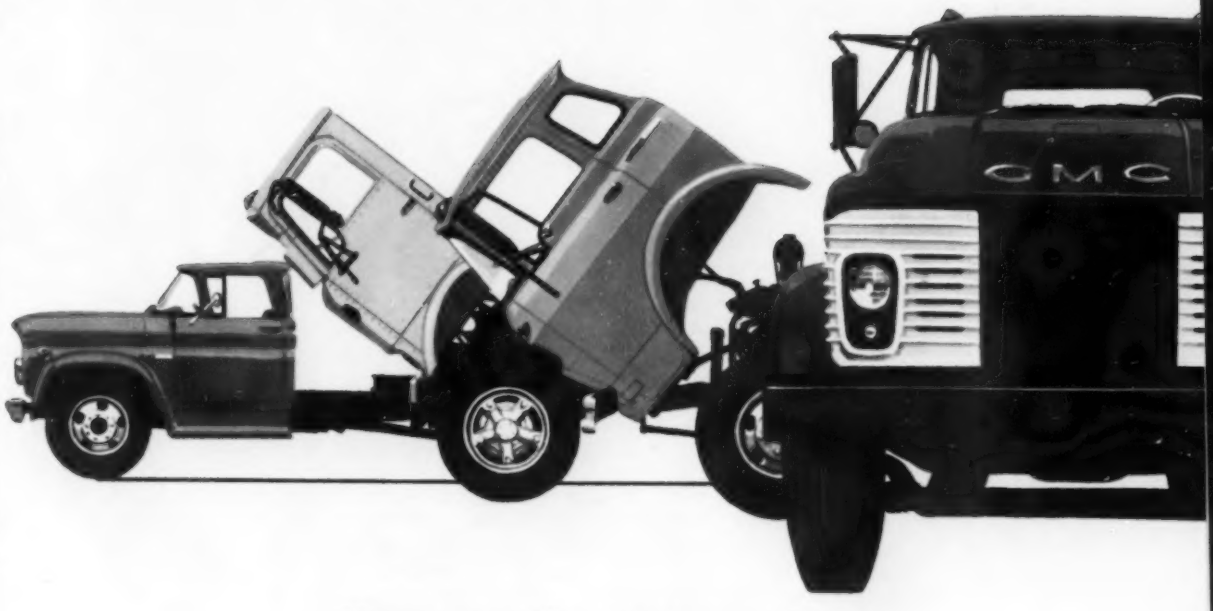
Highway users representatives in Washington are incensed over the Administration's newest recommendations on national transportation policy. The Department of Commerce has proposed certain measures to obtain "a balanced development of our transportation system." The Administration would maintain this hand-in-hand march toward "balance" by slowing down some systems and by encouraging the growth of others. The highway transportation industry would be curbed in certain ways; and use of the private automobile by the citizenry would be discouraged in some areas. Or new tolls might be levied on highway users and the revenue diverted to other, ailing transportation systems, thus accomplishing a dual objective by "robbing Peter to pay Paul."

Specifically, the transportation consultants hired by the Administration said: "The federal government contributes toward the problem (of urban congestion) with its huge highway program." They recommended local toll charges on highway urban expressways and parking lots to help reduce highway congestion and to finance mass transit improvements.

* * *

Highway engineers have repeatedly admitted that highways alone cannot solve the commuter transportation problem in urban areas. Three years ago, yes, it appeared to critics that a number of highway officials believed they had a mandate from Congress to ram eight-lane expressways into congested areas, without regard for community master plans, and seemingly with no sense of responsibility to provide for mass transit or bus services. This is not true today, and the BPR, AASHO, the American Municipal Association, and the National Committee on Urban Transportation can claim credit for a far more wholesome atmosphere.

But the use of highway funds - for any purpose other than the construction of the badly needed Interstate System and other roads - is a bit hard to swallow.



Here are the reasons why

GMC TRUCKS ARE CUTTING CONTRACTORS' COSTS ACROSS THE NATION!

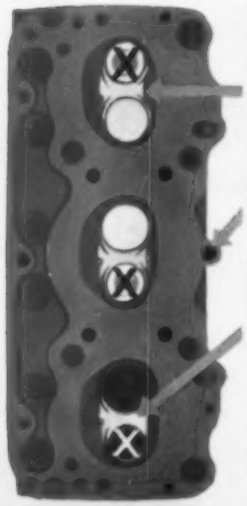
NEW EXTENDED-LIFE ENGINES

NEW, STRONGER, MORE DURABLE CHASSIS

NEW, WIDE RANGE OF EXTRA-LIFE CABS

CONTRACTORS FAVOR NEW EXTENDED-LIFE V-6 ENGINES!

Here's why—these exclusive, rugged engines produce full, usable torque at low, life-saving speeds . . . cut wear and increase fuel economy. Accurately controlled dynamometer and road tests indicate these advanced engines have a life potential of up to 200,000 miles of continuous operation without a major overhaul . . . with the proper maintenance and application.

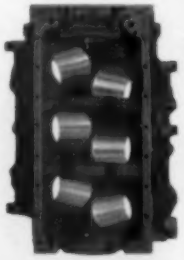


Completely machined combustion chambers assure equal displacement in each cylinder for smoothest power. There are no destructive "hot spots" due to uneven carbon build-up.

6 bolts around each cylinder (not 4) make a positive head-to-block seal and practically eliminate bore deflection.

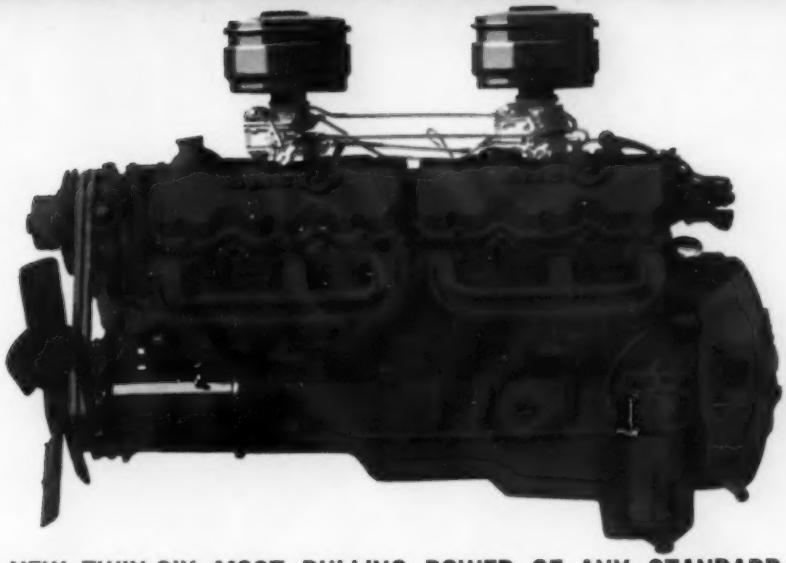
Wide bridge (shown with valves removed): permits better cooling, up to 3 times more water circulation for faster heat transfer and greatly increased valve life.

Note: No two exhaust valves **(X)** are adjacent. This prevents heat concentration and extends valve life.



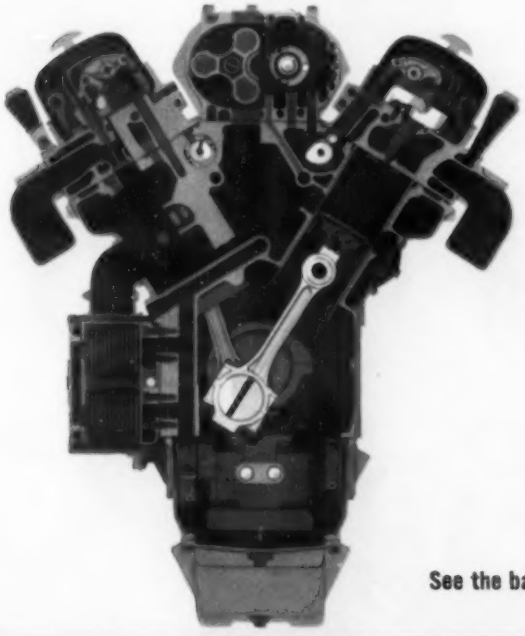
High-strength, rigid engine block! New short V-6 block, extra strong inner ribbing, staggered cylinders, deep skirt 3" below crankshaft centerline —all give greater rigidity, add years of life to components.

NEW GMC GAS ENGINES PROFIT-PERFORMANCE ON EVERY HAUL		
Model	Gross Torque Range	Max. Horsepower
305A	258-260 @ 1400-2200	150 @ 3600
305B	264-266 @ 1100-2000	150 @ 3600
305C	268-270 @ 1200-2100	165 @ 3800
351	308-312 @ 1400-2400	180 @ 3400
401	375-377 @ 1200-2000	205 @ 3200
702	625-630 @ 1400-2100	275 @ 2400



NEW TWIN-SIX MOST PULLING POWER OF ANY STANDARD GAS ENGINE! Now contractors are getting 625-630 pounds-feet torque over an extended 700 rpm range! This is all the working power and reserve power needed to get the biggest construction loads moving—and keep them rolling—with least gear shifting.

It has proved to be lasting power, too. Maximum governed engine speed is only 2400 rpm. This low-stress, easy-stroking speed greatly extends engine life, cuts operating costs to the bone.



NEW V-6 DIESELS MORE POWER PER DOLLAR! Proved, efficient 2-cycle design with power on every downstroke gives you more power per dollar, more power per pound, more power per cu. in. displacement! New 6V-71 engines have all the proved performance, economy and durability features of the famous 6-71SE Series, the power plants that have set new time-saving and money-saving records in hundreds of millions of miles of operation.

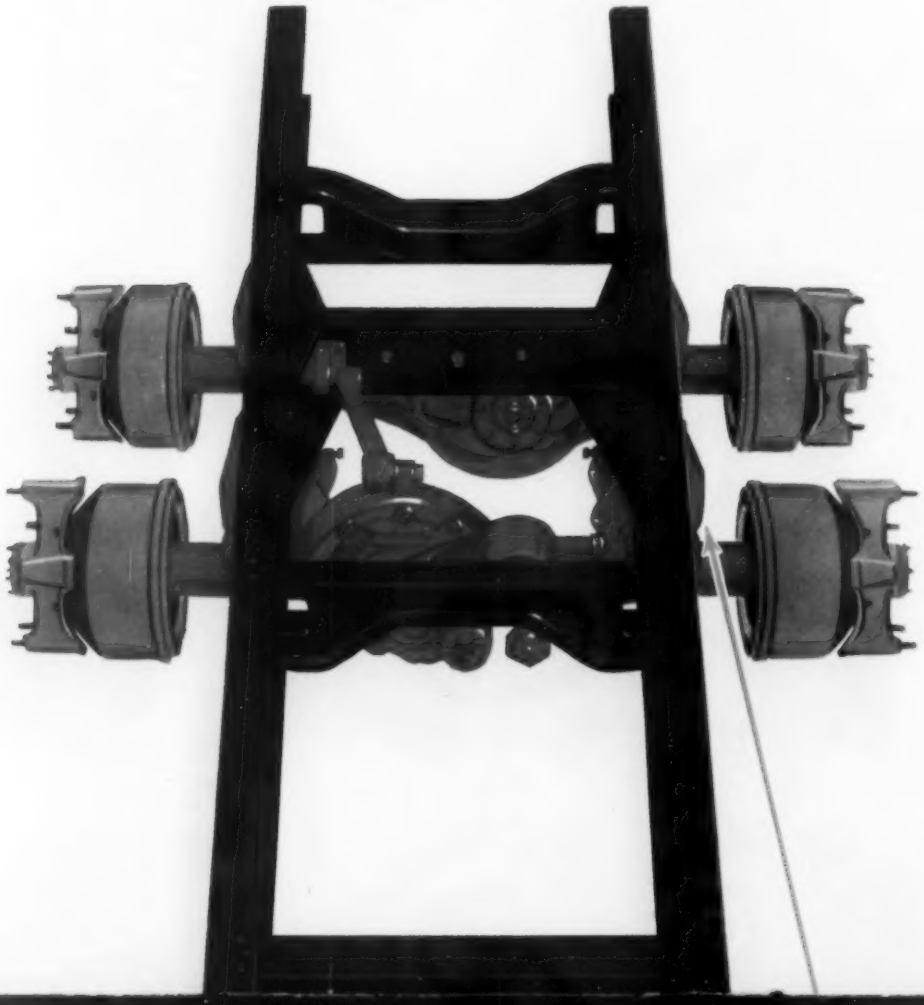
POWER-MATCH YOUR JOB WITH THESE NEW GMC DIESELS		
Model	Max. Torque	Max. Horsepower
6V-71	577 @ 1200	189 @ 1800 210 @ 2100*

*No extra cost

See the back page for the most advanced trucks in 20 years!

NEW EXTENDED-LIFE ENGINES

New vari-rate rear suspension—standard equipment on 4-wheel models! You get longer life with GMC's new 3-inch-wide rear springs because they are under less stress. Braking and torque forces are directed to the frame by radius-rod leaf. New, progressive cam action adjusts to the load for an easier ride.



Totally new frames . . . up to 35% stronger! Unique design, stronger and lighter materials guarantee extra payload every trip and extra durability on your hauling job. 5500 series and up have new, extra-strength SAE 950 hi-tensile steel frame standard. New L-type reinforcements are also stronger.

Bigger payloads, less maintenance! With this new GMC tandem suspension, you have less unsprung weight, less truck weight for bonus payloads. Rubber mounts and bushings at all wear points practically eliminate service. True alignment of axles and equal load distribution at all times increase tire and axle life.

New, stronger, wider track front axles! New high-capacity, longer-life front axles have as much as 12″ wider track, wider spring centers for increased stability, shorter turning and improved handling.

Smoother ride, easier handling for 1960! With GMC's new independent front suspension, standard on 4-wheel models through 25,000 GVW, each wheel acts separately to better absorb shocks. You get increased road stability and reduced steering friction. Lighter-duty models have maintenance-free torsion bar springs standard.

See the back page for the most advanced trucks in 20 years!

NEW, STRONGER, MORE DURABLE CHASSIS

CABS FOR EVERY LOAD, ROAD AND LAW

CONVENTIONAL

Traditional standby for general all-round service. This year, the new GMC 105″ BBC cab has wider seats, more head and legroom inside, yet up to 10″ lower outside. Bigger windshield gives you more safety vision. New suspended pedals mean easier driving and better cab sealing.

CONVENTIONAL NINETY-INCHER

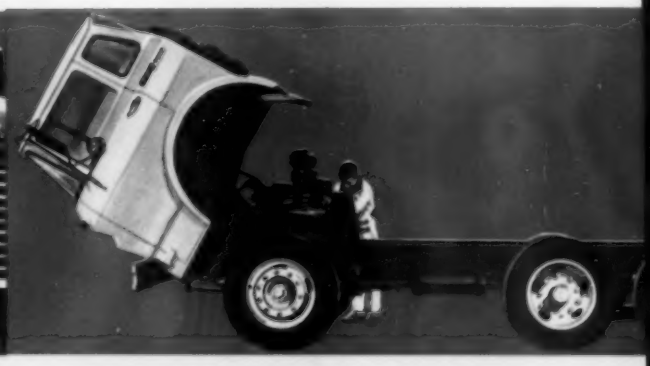
This is the increasingly popular new 90″ BBC conventional-type GMC cab . . . ideally built to mount big-payload dump bodies, flatbeds and all construction bodies. Greater front axle loading gives better weight distribution for bigger construction hauls.

STEEL TILT

With 72″ BBC and front axle set-back 52″, you have less over-all length and shorter wheelbases to mount longer bodies, haul longer trailers. More weight on the front axle means you can carry bigger payloads. Turning circles are shorter, too. Front vision is the best you can get.

QUICK, EASY SERVICING

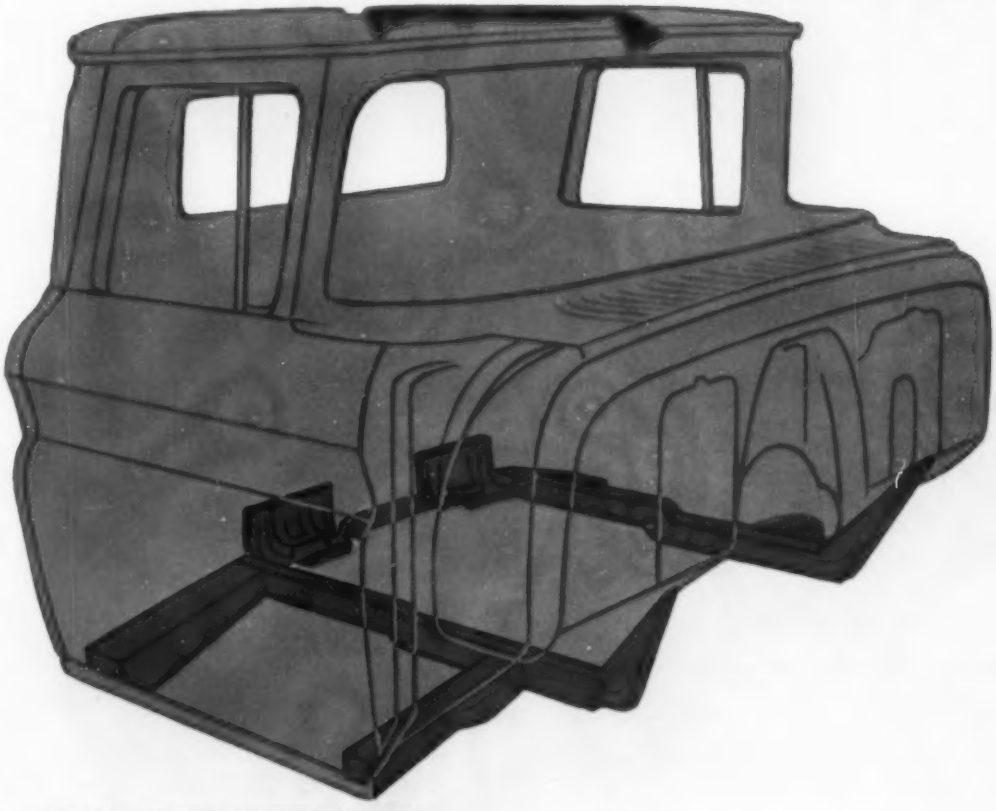
New GMC Conventional Nintey-Inchers speed maintenance and cut costs with the exclusive 3-piece side-opening hood and swing-out grille sections that expose the entire engine compartment.



Manually tilting of GMC's steel tilt-cabs is quick and easy with assist of torsion bar spring. Engine and all accessories are right out in the open for convenient servicing. Stationary island keeps controls in proper alignment and adjustment at all times.

DELUXE QUALITY IS STANDARD

For 1960, GMC is giving contractors all these extra-value features at no extra cost: foam-rubber seats, easily-removed instrument clusters for convenient servicing, steel-framed door windows to prevent chipping, rust inhibitor between door panels, and new 777 Super Enamel that keeps its luster longer, gives greater rust protection than previous finishes.



NEW, EXTRA-LIFE CABS

New GMC cabs will stand up for many years even on the most rugged hauls. This greatly extended on-the-job durability is the result of full double-wall construction, extra-heavy reinforcing inside the cab, and special, sturdy understructure—as shown above.

TEAR OUT HERE—See the back page for the most advanced trucks in 20 years!

NEW, WIDE RANGE OF EXTRA-LIFE CABS

Highest performance of any gas-engine tilt-cab! This new GMC LW7000 Series is powered by the exclusive Twin-Six with 625-630 pounds-feet torque at 1400-2100 rpm. Easy-to-service, easy-to-drive steel tilt-cab trucks meet the hauling demands from 19,500 lbs. GVW to 76,000 lbs. GCW.

Increased front axle loading, bigger brakes, frames up to 35% stronger are just a few of the advantages contractors are getting with the industry's first and only full line of 90" BBC trucks. With choice of responsive, extended-life V-6 or Twin-Six gas engines and fuel-saving, high-performance V-6 diesels, you can power-match new Conventional Ninety-Inchers for every construction haul, 19,500 lbs. GVW to 120,000 lbs. GCW.

Contractors' favorite pickups—with good reasons. Only new GMC pickups have more durable cabs; new smoother-riding independent front suspension, exclusive new V-6 power. You can choose from 34 combinations, including rugged 4-wheel drive models.

GMC
GENERAL MOTORS CORPORATION
TRUCKS

From ½-ton to 60-ton . . .
General Motors leads the way!

New from the BIG GMC BREAKTHROUGH in truck engineering...a complete new line of "Cost-Busters" that drastically cut your operating costs, increase payloads and last longer on your hauling job.
See your GMC Dealer for actual proof. He's listed in the Yellow Pages.

GMC Truck & Coach—a General Motors Division—Pontiac, Michigan

THE JOB was drilling 3″ holes to 25′ depth, in limestone so hard the insert carbide bits had to be reground after every 48′ to 50′ of drilling.

THE TEAM is a Jaeger "900" rotary compressor behind two Thor TR-5 air-and-hydraulic crawlers with 4½″ drifters.

FOOTAGE AVERAGED 2′ per minute (1′ per drill), the rate varying with the ledge strata.

A NOTABLE ECONOMY was in the fuel-saving, engine-saving speed of the compressor. *It maintained 100 psig at the drills without ever running faster than 1400 rpm.*

World's slowest running "900" compressor powers today's fast drilling team

JAEGER DELIVERS MORE AIR FROM SAME HORSEPOWER

Jaeger "900" uses the same GM 6-110 Diesel as other "900" compressors, but delivers its rated capacity at 100 rpm slower speed — 1700 instead of 1800. Its fuel factor is more than 500 cu. ft. of delivered air per pound of fuel consumed. The engine lives longer because it takes it easier throughout its operating life. Compressor life is longer, too. 8000 hours without a vane replacement is not unusual. Ask any Jaeger owner; ask your Jaeger distributor — or send for new Catalog JC-O.

Air-and-hydraulic drill adapts to any desired position. Drill and compressor make a self-powered mobile "team".

THE JAEGER MACHINE CO., 223 Dublin Ave., Columbus 16, Ohio

Jaeger Machine Co. of Canada, Ltd., St. Thomas, Ontario

PUMPS • MIXERS • TRUCK MIXERS • PAVING MACHINES

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The CLEVELAND JS-30

WITH INSTANT LATERAL

DIGGING WHEEL POWER-SHIFTS 5 FEET FROM SIDE TO SIDE

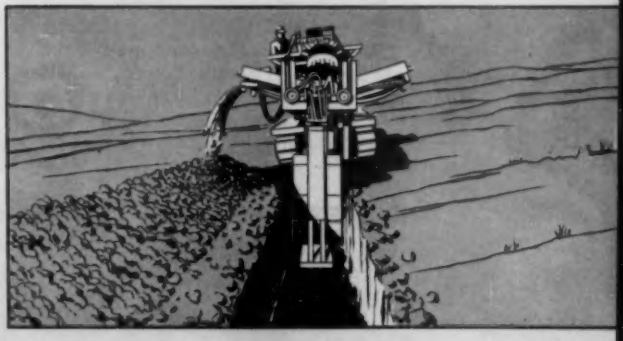
Digs trench behind either crawler or anywhere within its 6-foot width

Lateral shifting of the JS-30's wheel, up to 2½ feet to either side of center, is done hydraulically under lever control at operator's location, so trench can be dug at any point within 6-foot-wide path made by the crawler. Edge of 24-inch trench can be dug 5 inches outside either track, permitting trench to be flush with parallel pavement, curbs, sidewalks, etc. With wheel tilted, trench can be dug virtually flush with trees, poles, fences and other above-ground obstructions.

INSTANT DIGGING WHEEL TILT

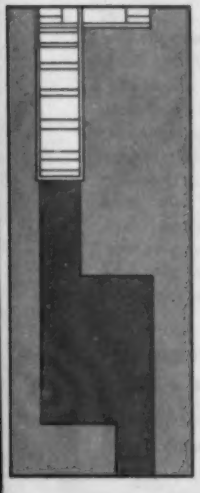
cuts blocking, cribbing costs

Hydraulic power-tilting of the JS-30's digging wheel to either side of vertical – a total tilting range of 14°– under lever control at the operator location, permits digging vertical trench on side slopes and in similar conditions with one crawler track on a higher level than the other. This eliminates the necessity of blocking, cribbing, etc. in such conditions. Power-tilt adds 7 inches to the outside cut of the digging wheel. This in combination with lateral power-shift permits digging trench virtually flush with above-ground obstructions.



—a trencher of amazing utility

DIGGING WHEEL POSITIONING



EXCAVATES BELLHOLES

saves on trench width

Power-shifting and power-tilting of the JS-30's digging wheel are especially valuable in cutting trench to extra width required at pipe joints. This permits digging trench to narrow width except where bellholes are required. By utilizing power-shift the JS-30 can dig up to 6 ft. wide, down to 5½ ft. deep — reduces slower hoe-work to clean-up, etc.

PLUS THESE OUTSTANDING CLEVELAND FEATURES

- Every operation is automatic, completely controlled at operator seat.
- Hydraulic crumbing shoe raised and lowered under lever control from operator seat.
- Automatic conveyor shifting for side-to-side positioning.
- V conveyor for faster, higher, more efficient spoil discharge.
- Pulley-enclosed, dual conveyor drives, with instant belt speed and direction control.
- 33 positive non-slipping digging speed-and-power *combinations*.
- World's finest trencher crawlers, 1000-hour-lubricated.

DIGGING CAPACITY: 5 ranges, from 11" to 24" wide, to 5½' deep; to 6' wide with power-shift.

POWER: 370 cu. in. diesel—59 HP @ 1250 RPM.

WIDTH: 6' over crawlers; 7' 11" over conveyor.

HEIGHT: 8' 2" digging; 9' 5" roading.

LENGTH: 27' 3".

Pioneer of the Modern Trencher

The CLEVELAND TRENCHER Co.

20100 St. Clair Avenue • Cleveland 17, Ohio

. . . for more details circle 299 on enclosed return postal card

New Check on Steel Connections

A simplified laboratory method has been developed for determining the properties of commonly used, semi-rigid connections for steel beams. The procedure makes it possible for a structural steel design engineer to check beam coefficients and end-fixed movements as soon the the type connections are known.

The structural engineer using the method can obtain properties of semi-rigid connections directly from the fabricating shop, by measuring only the vertical deflection of the specimens.

The technique, developed recently by two students, David N. Frayne and Nabil Nassar, under Prof. L. C. Maugh of the University of Michigan, evolved from a joint project sponsored by the American Institute of Steel Construction, and The R. C. Mahon Co. of Detroit. The new lab technique employs vertical displacements obtained from dial gages—found both adequate and desirable to provide necessary information quickly to aid a structural engineer in designing frame with semi-rigid connections.

According to Prof. Maugh the method is a convenient and practical one and, in certain respects, results are more accurate than those from the usual procedure inasmuch as the proposed lab measurements include the non-linear stress zone in the vicinity of the column.

FRONT COVER SCENE

The cover photograph this month shows a heavy highway grading job in progress on US 60 relocation through Salt River Canyon in Arizona. The contractor: W. J. Henson of Prescott; Lewis E. Harris, project superintendent. The machine pictured: An Allis-Chalmers HD-21 tractor (with the new 21000 engine) being used by operator Frank Sisto for pioneering cuts for this 4.1-mile project in extremely rugged terrain.

The work has been handled under a condition typical of many western relocating jobs, namely, of maintaining traffic through the work because of the absence of any detour route. Traffic was kept moving except for two hours daily when the contractor shot his rock and got in with equipment to doze and clear the roadway of debris.

The operator, by the way, is a full-blooded Apache Indian, and as an operator reported to be one of the best.

Available from Texaco Complete Review on Mobile Lubrication Equipment

The article, "Choosing the Right Mobile Lubrication Equipment," which begins on page 57 of April Roads and Streets, is an adaptation by permission of a more complete review published in "Lubrication," technical magazine of Texaco, Inc., devoted to the selection and use of lubricants. The credit statement was inadvertently omitted in making up the pages at the printer's.

Readers of Roads and Streets wishing the original 30-page article from "Lubrication," March, 1960, can secure a copy free by writing to the Editor of Roads and Streets, 22 West Maple Street, Chicago, Ill., for forwarding; or by writing directly to the Advertising Department, Texaco, Inc., 135 East 42nd Street, New York 17, New York.

"TIRED" in a wink!

You'll get "tired" in a wink when you use Southern Tire's time-tested 'round-the-clock scheduling for your retreading needs. Fast, efficient pickup and delivery service at your job site . . . *after work hours* . . . helps you cut costly downtime . . . lick tough schedules. And retreads as much as ¼" deeper than ordinary retreads mean longer service for your tires under rugged conditions! Expert workmanship, ultra-modern equipment plus finest quality rubber manufactured to Southern Tire's own specifications guarantee *new tire* mileage at approximately half of new tire cost!

OVER 75,000 TIRES WORTH OF EXPERIENCE!

All sizes from 1100 x 24 to 33.5 x 33.

Always deal with an independent—developers of every major improvement in the industry.

SOUTHERN TIRE COMPANY

1414 Broadway
SHEFFIELD, ALA.

Phone Collect
EV 3-2312

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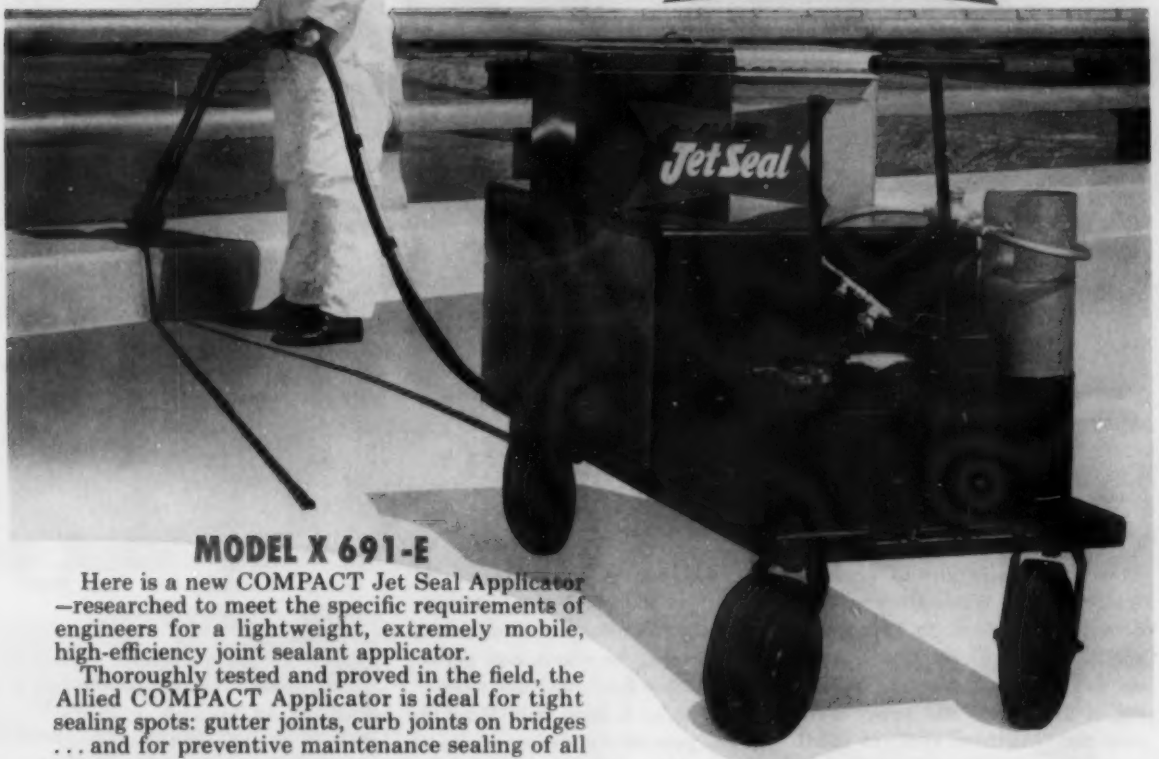
NEW COMPACT APPLICATOR

FOR ALLIED Jet Seal



MODEL X 691-E

Here is a new COMPACT Jet Seal Applicator —researched to meet the specific requirements of engineers for a lightweight, extremely mobile, high-efficiency joint sealant applicator.

Thoroughly tested and proved in the field, the Allied COMPACT Applicator is ideal for tight sealing spots: gutter joints, curb joints on bridges . . . and for preventive maintenance sealing of all types.

- Incorporating the exclusive features of the large JET SEAL Applicator (MODEL 8591-D): Indirect propane heating—Positive shut-off valve at mixing nozzle—Selection of mixing nozzles for any size job—the COMPACT Applicator also features:
- Light weight: 650 lbs. 22 inches wide, 48 inches long. Will turn in the space of its own length. May be transported in a pick-up truck.
- Ideal for sealing vertical and overhead joints. Light enough to be hoisted.
- Can apply 100 lbs. of Allied JET SEAL per hour. Each of the two component vats holds 10 gallons of material.

Manufactured by Allied Stroud Corp., a division of Allied Materials Corp., the Allied Stroud Applicators are the only equipment authorized for the application of Allied JET SEAL (Products 9015H, 9015M). Allied JET SEAL is the original two-component, polysulfide, polymer type joint sealing compound.

For complete information about the Allied Stroud Corp. Applicators and Allied JET SEAL, write:

ALLIED MATERIALS CORP.

PRODUCERS, REFINERS AND COMPOUNDERS OF SPECIAL ASPHALT PRODUCTS

ALLIED BUILDING • 5101 N. PENNSYLVANIA • P. O. BOX 7278 39th Street Station • Oklahoma City, Okla.
Plants: Stroud, Okla. • Detroit, Mich. • Los Angeles, Calif.

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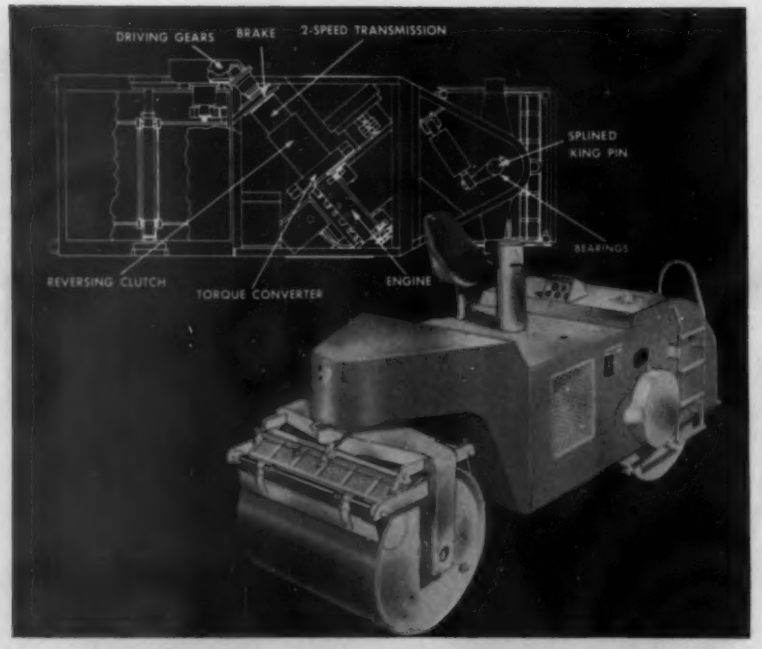

Here's a new angle in steel wheel rollers

Power goes straight to work in AMROL Steel Wheel Rollers — no detours through extra sprockets, shafts, chains or other awkward drives. Exclusive *diagonal* mounting of the engine and power train puts the "business end" in ideal alignment with the drive roll gear. Torque converter drive automatically matches power and speed to the job, cushions the entire machine against sudden shock loads.

A-M "Direct-A-Matic" control lets the operator change speed and direction independent of steering. From his comfortable, adjustable bucket seat, he commands perfect visibility — front, rear and sides.

Servicing is easy, too. Four big doors provide convenient access to the engine and control compartments and there's a fifth door for access to the drive roll.

Get the whole story on AMROL Steel Wheel Rollers — 5-8 ton and 8-12 ton.

SEE YOUR DISTRIBUTOR FOR ALL THE FACTS

USE THIS COUPON FOR FREE INFORMATION

AMERICAN-MARIETTA COMPANY, Construction Equipment Division
Milwaukee 1, Wisconsin

Send complete information on AMROL Steel Wheel Rollers. ☐
I'd also like to have a salesman call. ☐

Name _____ Title _____

Firm _____

Address _____

City _____ State _____

AMERICAN-MARIETTA
COMPANY
CONSTRUCTION EQUIPMENT DIVISION

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People

John C. Black

J. C. Black Retires as Gillette Editor

John C. Black, for more than thirty years on the editorial staff of Gillette Publishing Company, retired last month. He was engaged at different times on all of Gillette's engineering publications, including Powers' Catalog and Data Book, which will be remembered by older readers.

He was the first editor of Caminos y Calles, Gillette's original publication in Spanish, and, earlier, was co-author with H. P. Gillette of several books on civil engineering construction.

Black likes to recall that he has watched the development of the machine era in roadbuilding from its inception to now. In 1910 during a year off between high school and college, he was chainman on a heavy railroad job in the Pacific Northwest, where not one piece of powered equipment was in service. Rock drilling of all classes was done by hand (hammer for short holes, churn drill for deep). Earth excavation was by No. 2 wheel scrapers or ¼-yard slips or just plain pick and shovel, helped out at times by horse-drawn plow or a little black powder. Hauling was by 2-wheel carts, slat-bottom dumps, and a few of the new-fangled lever-operated wagons, except where distance and volume warranted a light industrial railway—strictly horse and mule power. Then, of course,

Continued on page 37

RIGHT ON SCHEDULE

Gyro-Flo powered CRAWL-IR drills average 400 ft. daily in Westchester Granite with 3-inch Carset bits

These three Ingersoll-Rand CRAWL-IR drills, each powered by a 600-cfm Gyro-Flo compressor, helped a New England Contractor to stay right on schedule in removing a million yards of rock for the Elmsford Section of the Cross-Westchester Expressway. Drilling holes with 3" Carset bits, each machine has averaged about 400 ft per day in hard Westchester granite. All tower positioning is hydraulically controlled and 12' 3" boom swing permits drilling on both sides of the crawlers at a single setting.

The 600-cfm Gyro-Flo rotary compressors offer maximum economy and dependability—smoother running, smaller, lighter, virtually maintenance-free, with air temperatures under 200°F, low oil consumption and closer regulation at all loads from 0 to 100% capacity. Gyro-Flo units are available in 6 sizes from 85 to 900-cfm, for every air-powered job.

Ask your I-R distributor or engineer for complete information on the cost-saving CRAWL-IR Gyro-Flo combination.

Ingersoll-Rand

64A14 11 Broadway, New York 4, N.Y.

A CONSTANT STANDARD OF QUALITY IN EVERYTHING YOU NEED FOR DRILLING ROCK

. . . for more details circle 328 on enclosed return postal card

Lima owners agree that "pound for pound, Limas are the best you can buy"!

Humphreys and Harding, Inc., has a $2½ million contract for ramps and overpasses on 2000 ft. of the new $60 million Southwest Freeway. Ralph J. Clark, general superintendent, has this to say about his company's 2½-yr.-old 30 ton Lima 44-T: "Before we bought the 44-T we talked to other Lima owners and discovered that the consensus is that 'pound for pound, Limas are the best you can buy'!"

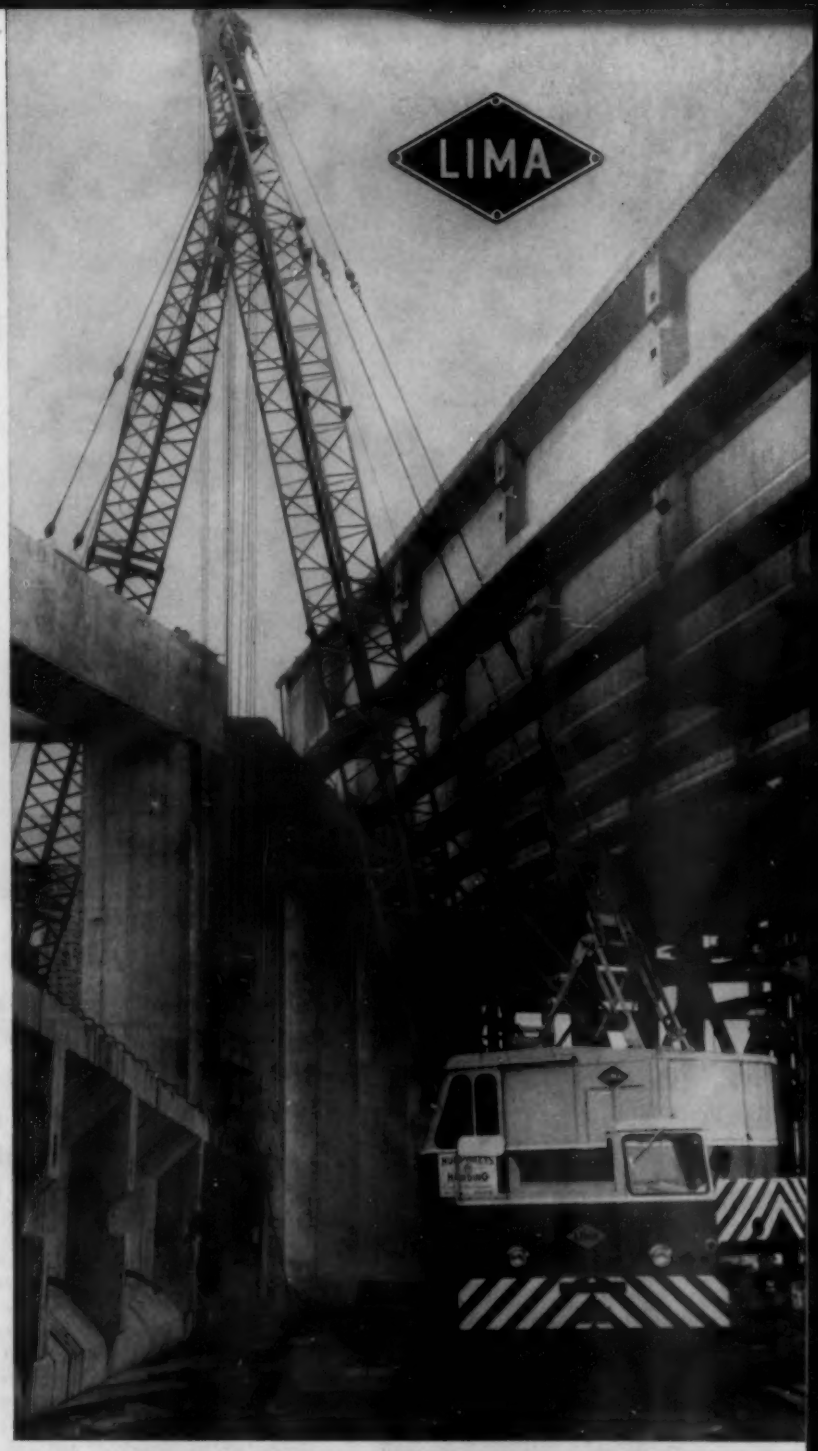
Economical, Easy Maintenance

"It outperforms all other cranes in its weight class. In fact, the Lima 44-T does as well as another make crane we have which is rated 10 tons heavier. The Lima always holds its own. It's fast; performance is good. Maintenance is economical and easy.

"And it's versatile, too. We equip it with a 3-ton diesel hammer and use it just as we would a crawler rig for pile-driving. It reaches out long and low to pour concrete from a 1¼-yd. bucket on a 105-ft. boom."

See for Yourself

Why not take a tip from Mr. Clark. When you're in the market for a crane, shovel or dragline, talk to Lima owners and watch Limas at work before you decide. There's a type and size exactly right for your needs. Cranes to 75 tons on rubber, 140 tons on crawlers; shovels to 8 yd.; draglines variable. Ask for facts and figures from your nearby Lima distributor or write to Construction Equipment Division, Baldwin-Lima-Hamilton Corporation, Lima, Ohio.



Mobile Lima 44-T maneuvers into tight spot for big lift. Using balance bar, it helps raise 86-ton prestressed concrete beam for Washington's new Southwest Freeway.

DISTRIBUTORS IN PRINCIPAL CITIES OF THE WORLD

LIMA Construction Equipment Division, Lima, Ohio

BALDWIN · LIMA · HAMILTON

6028

Shovels • Cranes • Draglines • Pullshovels • Roadpackers • Crushing, Screening and Washing Equipment.

. . . for more details circle 285 on enclosed return postal card

People

Continued from page 34

the Chamber of Commerce of the United States for "outstanding con the good old wooden wheelbarrow had its place.

Following this early experience, he served in varying capacities with the Washington state highway department and with several city engineering departments, and for many years in association with H. P. Gillette in railway valuation work.

This background of practical construction following an engineering education stood Mr. Black well in his role as a publication and book editor, which he entered in the 1920's and remained with until his recent retirement.

U.S. Chamber Honors Equipment Dealers

Seven prominent equipment distributors were given awards from tributions to the construction industry and to the advancement of the free enterprise system."

They were named, along with 55 other construction industry executives, at the recent National Construction Industry Conference in Washington, D.C.

The leaders honored were: L. Miner Doolen, Telford Equipment Co., Lansing, Mich.; H. D. Anderson, Rish Equipment Co., Bluefield, W. Va.; A. F. Sersanous, Loggers & Contractors Machinery Co., Portland, Oregon; A. F. Garlinghouse, Garlinghouse, Fremon & Co., Los Angeles; R. L. Arnold, Arnold Machinery Co., Inc., Salt Lake City; J. W. How, Edward R. Bacon Co., San Francisco; and Paul E. Reinhold, of the recently dissolved Atlas Equipment Co., Pittsburgh, Pa.

Doolen, Anderson, Sersanous, Garlinghouse and Arnold are past-presidents of the Associated Equipment Distributors. How has been an AED director, and Reinhold is a past president of the American Road Builders Association.

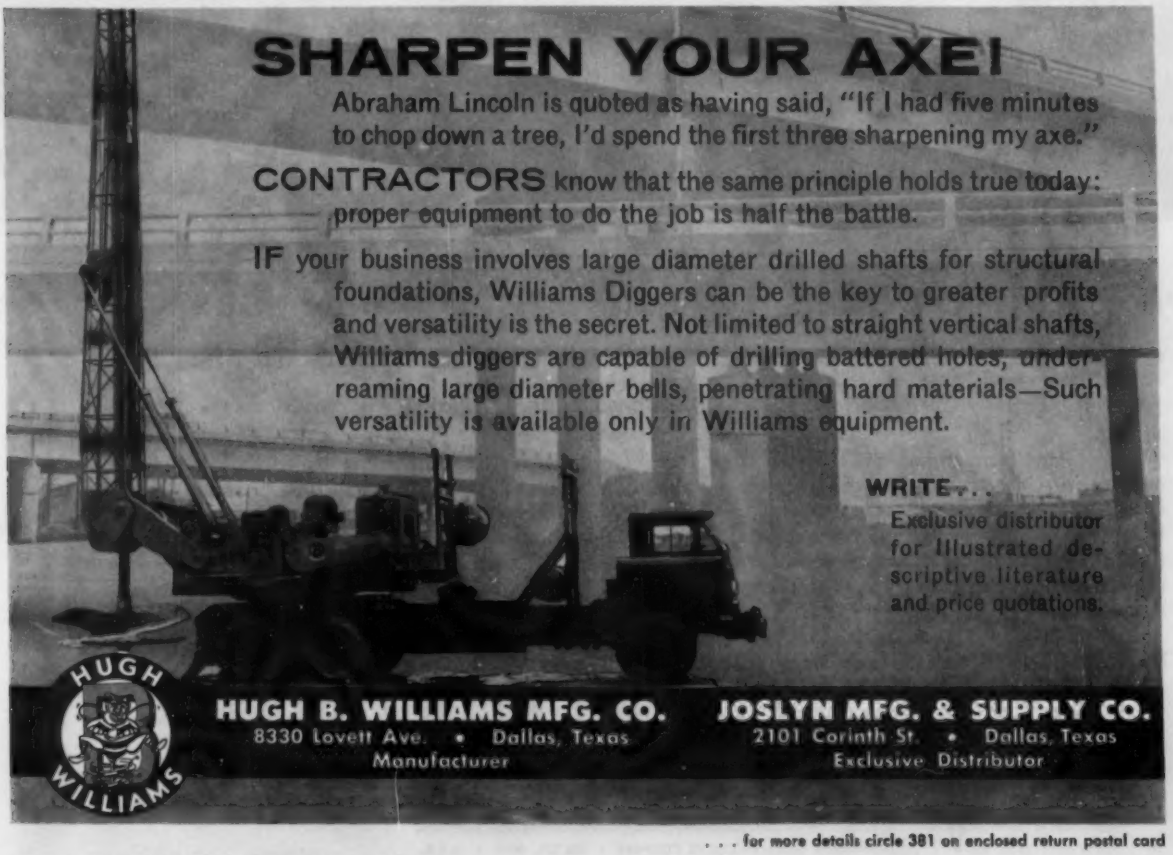
In addition, all of these men are and have been prominent in industry association work at the local level and in civic affairs.

Marker Advanced by Asphalt Institute

The promotion of Vaughn Marker to the position of Pacific Coast Division Managing Engineer, The Asphalt Institute, with headquarters at Berkeley, Calif., has been announced by J. E. Buchanan, Institute president. Marker succeeds B. A. Vallerga who is joining the Golden Bear Oil Company of Los Angeles.

Marker will direct a field engineering staff of eight men in seven

Continued on page 39


SHARPEN YOUR AXE!
Abraham Lincoln is quoted as having said, "If I had five minutes to chop down a tree, I'd spend the first three sharpening my axe."
CONTRACTORS know that the same principle holds true today: proper equipment to do the job is half the battle.
IF your business involves large diameter drilled shafts for structural foundations, Williams Diggers can be the key to greater profits and versatility is the secret. Not limited to straight vertical shafts, Williams diggers are capable of drilling battered holes, underreaming large diameter bells, penetrating hard materials—Such versatility is available only in Williams equipment.
WRITE . . .
Exclusive distributor for Illustrated descriptive literature and price quotations.
HUGH WILLIAMS
HUGH B. WILLIAMS MFG. CO.
8330 Lovett Ave. • Dallas, Texas
Manufacturer
JOSLYN MFG. & SUPPLY CO.
2101 Corinth St. • Dallas, Texas
Exclusive Distributor

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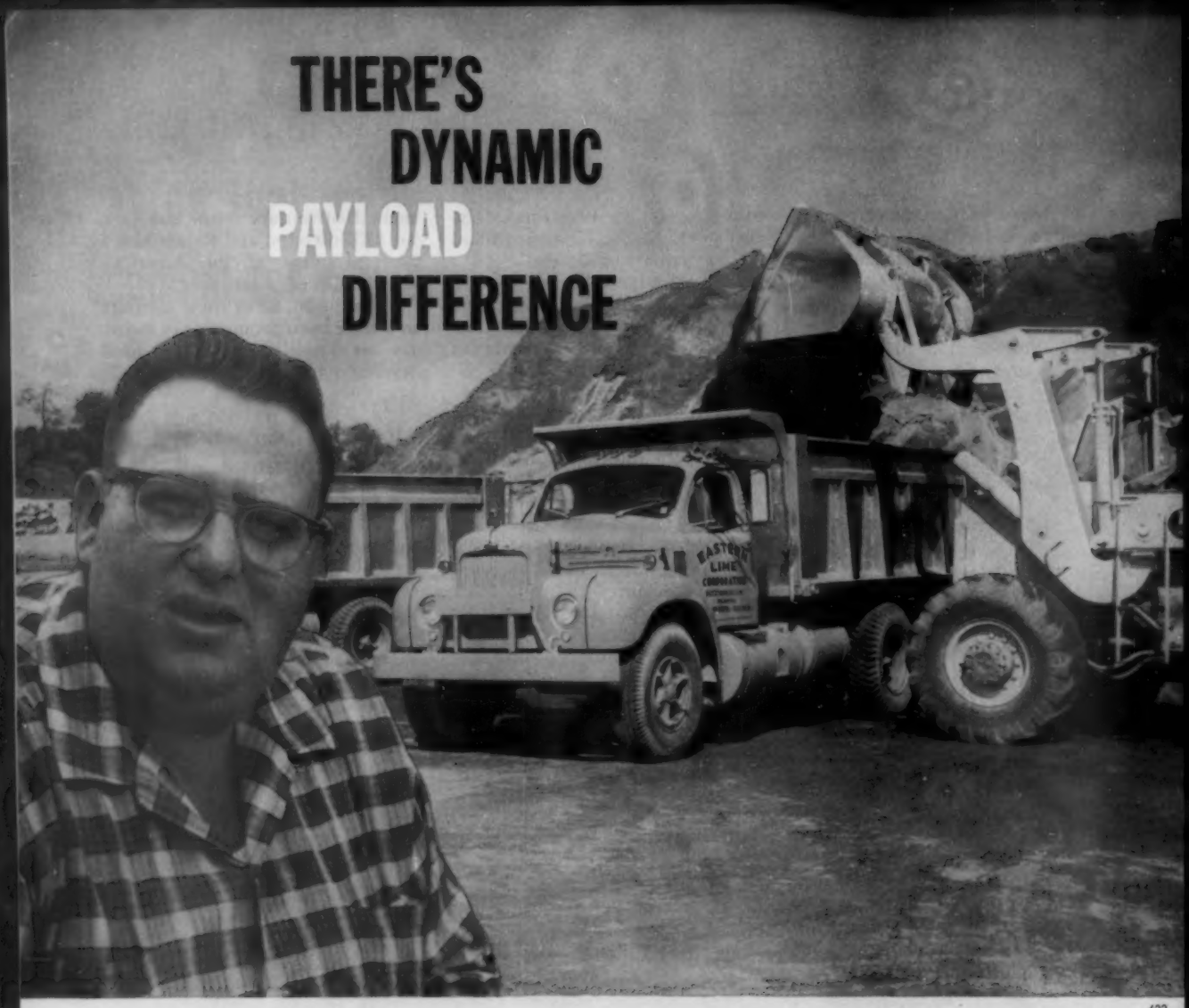


622

"EXTRA PAYLOADS will help pay for 4 new trucks—equipped with Hercules aluminum dump bodies!"

Reports Eastern Lime Corporation, Kutztown, Pennsylvania

"By switching from dump units supplied by contract haulers to 4 new company-owned trucks equipped with Hercules *aluminum* dump bodies and front telescopic hoists, we are able to haul bigger legal payloads—make faster return trips that really speed up our delivery schedules," says S. G. Meitzler, of Eastern Lime Corp., Kutztown, Pa.

"In hauling jobs that include moving crushed limestone rock of various size from quarries to cement mills . . . concrete, asphalt and blacktop plants . . . and to highway jobs . . . each 10-yd. unit hauls about 155 tons per day—averages 8 round trips totaling about 260 miles.

"We expect increased payloads to go a long way toward paying off our investment in the 4 new trucks."

Write for the complete story. We'll be happy to send you profit-packed information on aluminum bodies. Write Department C-560.

Hercules DUMP BODIES, HOISTS and DUMP TRAILERS

HERCULES STEEL PRODUCTS COMPANY • GALION, OHIO • U.S.A.

. . . for more details circle 327 on enclosed return postal card

People

Continued from page 37

Vaughn Marker

western states, including Alaska and Hawaii, via Institute district engineering offices at Olympia, Portland, Sacramento and Los Angeles.

The new division managing engineer joined the Institute in 1955 as a district engineer, recently becoming division paving specialist, an assignment he had earlier held with the California division of highways.

B. A. Vallerga

Vallerga to New Post

B. A. Vallerga, recently with the Asphalt Institute, has been appointed director of products engineering, Golden Bear Oil Company, Los Angeles, as announced by vice president R. L. Feldman. With headquarters at the firm's new laboratories at Bakersfield he will direct engineering and promotional activities relating particularly to use of petroleum products in soil

Continued on page 44

OWEN BUCKETS

new center line reeving doubles cable life

"Our new OWEN Bucket is great. That new center line reeving more than doubles our cable life," says Kenneth Muster, Supt. for R. F. Muntz, owner of the Hugo Sand and Gravel Co. of Kent, Ohio.

The tandem positioning of the lower closing sheaves permits the closing line lead to pass directly through the center of the head of the bucket. This exclusive OWEN feature eliminates excessive bending of the cable, resulting in increased cable life experienced by Hugo Sand and Gravel. It also permits the bucket to hang plumb from the crane boom.

This OWEN Clamshell, with all moving parts lubricated . . . with all arm and sheave pins, plus the main shaft, having triple lip grease seals . . . has heavily cut the high maintenance expense of handling this sand suspended in water that comes directly from the wash plant.

"Our operation is tough on a clamshell, but all these improved OWEN features have greatly reduced our maintenance costs and cut down-time," claims Mr. Muster.

Send us your requirements.
OWEN Engineers are at your service at all times.

The OWEN BUCKET Co.
BREAKWATER AVENUE, CLEVELAND 2, OHIO
BRANCHES: New York • Philadelphia • Chicago
Berkeley, Calif. • Fort Lauderdale, Fla.

. . . for more details circle 351 on enclosed return postal card

What other culvert material has all the

LONG SERVICE LIFE. Drainage pipe made of Beth-Cu-Loy steel sheets often outlives the original need. It can then be lifted out and placed in a new location for additional years of service. The copper content of the steel base, along with a heavy zinc coating, give Beth-Cu-Loy sheets a very high resistance to corrosion.

MEETS AASHO SPECS. Beth-Cu-Loy culvert sheets conform in every way to AASHO standards. Bethlehem furnishes a sheet manufacturer's certified analysis and guarantee, which includes the average chemical composition by ladle analysis.

EASY TO INSTALL. Light enough to be laid without special equipment. Long pipe lengths reduce the number of field joints, speed up laying.

FIELD JOINTS IN MINUTES. No sealing compound needed, no mortar to set. Just a connecting band of Beth-Cu-Loy secured around the joint with a few turns of a wrench on the bolts . . . it's no more complicated than that.

Steel

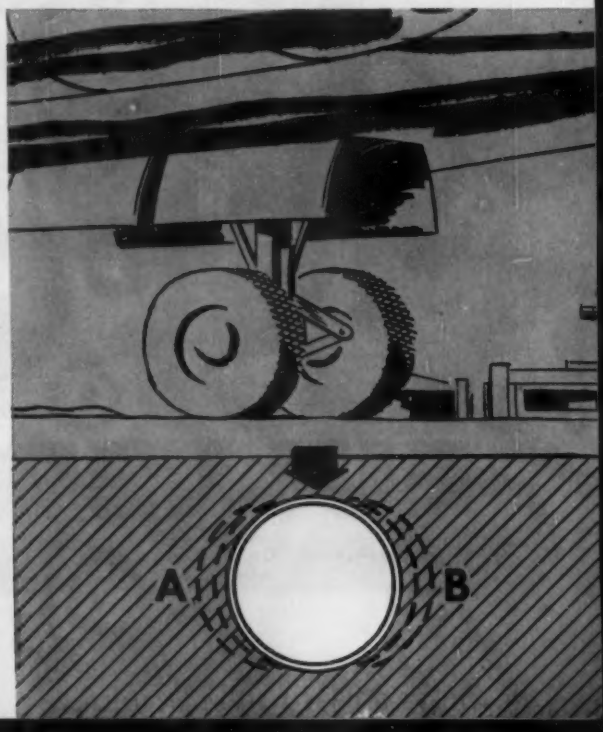
For strength
. . . economy
. . . eye-appeal

advantages of corrugated Beth-Cu-Loy sheets?

SIMPLIFIES GRADE AND ALIGNMENT. Because it is made of steel, a Beth-Cu-Loy drainage structure is highly resistant to fracture, needs no feather bed. Flexible enough to conform to slight changes in grade and alignment.

LESS COSTLY TO SHIP. Corrugated steel drainage pipe weighs a lot less per running foot, thus lowers shipping charges. Here, more than a quarter of a mile of Beth-Cu-Loy is handled on one truck trailer.

FLEXES WITH FILL. Pipe made of corrugated Beth-Cu-Loy steel is flexible transversely as well as longitudinally, thus can enlist the aid of surrounding material to support imposed loads. The drawing shows how a vertical load produces pressure against fill at points A and B, setting up counter-loads which largely offset the forces through the vertical axis.



BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.
Export Distributor: Bethlehem Steel Export Corporation

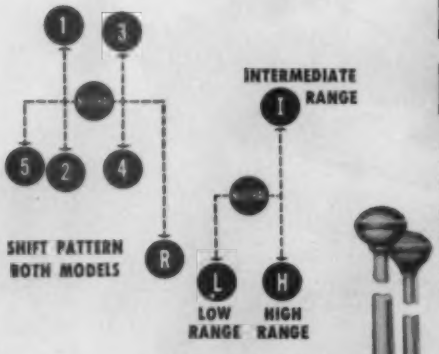
BETHLEHEM STEEL

BETHLEHEM STEEL

. . . for more details circle 288 on enclosed return postal card

NEW Fuller Heavy-Duty

10 closely-spaced gear splits plus deep reduction ratios



MODEL 15-G-1120

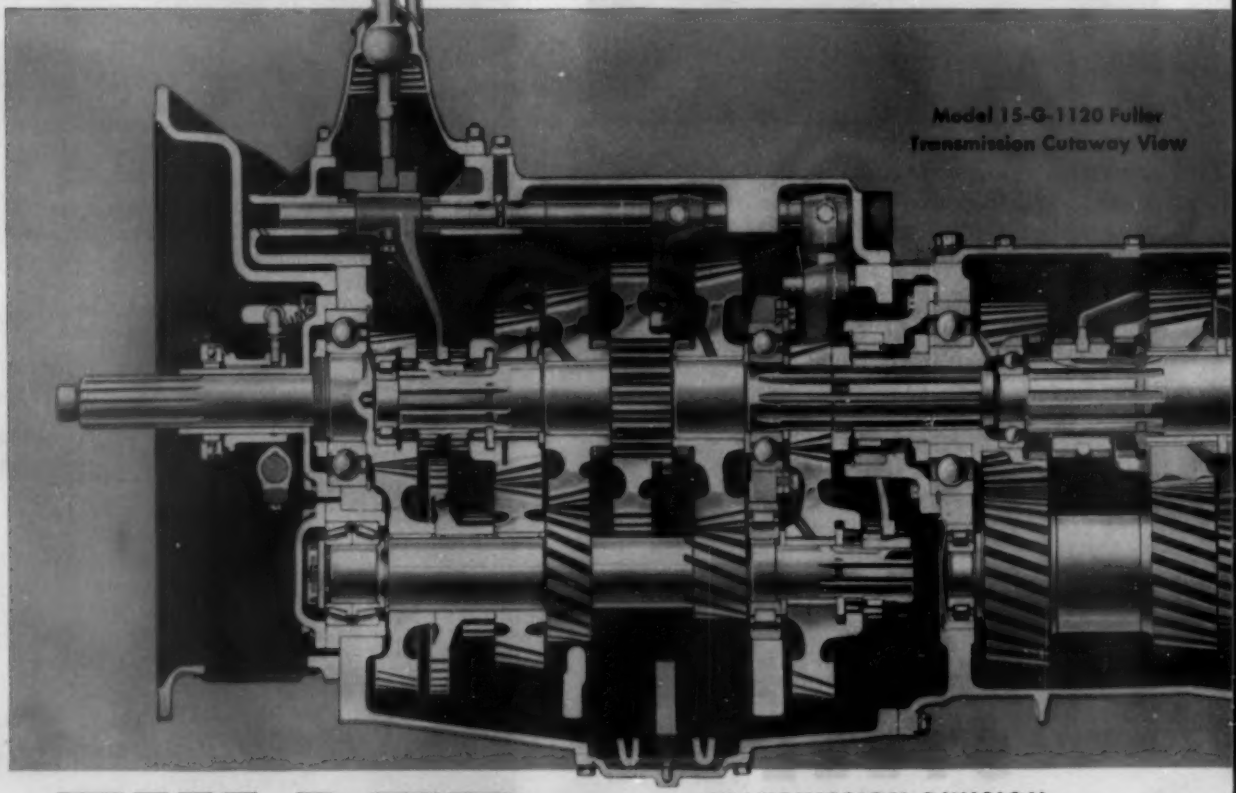
MODEL 15-M-1120

Fuller now offers two new 15-speed transmissions engineered for on and off-highway diesel truck operations demanding high capacity, long wear life and ease of operation . . . for logging, mining, construction, oil-field work, aggregates and ready-mix.

Advantages of the new transmissions include:

1. Extremely short installation dimension, which permits shorter wheelbase for tractors which formerly incorporated main and auxiliary transmissions.

2. Maximum operational flexibility with not only 10 closely-spaced gear splits, but also 5 speeds avail-



Model 15-G-1120 Fuller Transmission Cutaway View

FULLER TRANSMISSION DIVISION
MANUFACTURING COMPANY
KALAMAZOO, MICHIGAN

15-SPEED TRANSMISSIONS

designed for combination on and off-highway applications

able for low range operation through a deep reduction in the auxiliary.

3. A wide choice of optional gear ratios to match every job requirement.

4. Weight reduction obtained by eliminating support brackets, joints, cross members and a propeller shaft.

For full details on the Fuller 15-G-1120 and 15-H-1120 Transmissions, ask your dealer or write Fuller Manufacturing Company.

Model 15-G-1120: Standard Gear Ratios

SPLITS—OVER-HIGHWAY				LOW RANGE—OFF-HIGHWAY		
Speed	Split	Ratio	% Step	Speed	Ratio	% Step
10th	O'Drive-High	.636	33	5th-Low	1.33	
9th	O'Drive-Int.	.844	19			57
8th	Direct-High	1.00	33	4th-Low	2.09	
7th	Direct-Int.	1.327	32			76
6th	3rd-High	1.76	33	3rd-Low	3.68	
5th	3rd-Int.	2.32	41			86
4th	2nd-High	3.27	33	2nd-Low	6.83	
3rd	2nd-Int.	4.33	51			100
2nd	1st-High	6.54	33	1st-Low	13.67	
1st	1st-Int.	8.68				

Model 15-H-1120: Standard Gear Ratios

SPLITS—OVER-HIGHWAY				LOW RANGE—OFF-HIGHWAY		
Speed	Split	Ratio	% Step	Speed	Ratio	% Step
10th	O'Drive-High	.636	33	5th-Low	1.68	
9th	O'Drive-Int.	.844	19			57
8th	Direct-High	1.00	33	4th-Low	2.64	
7th	Direct-Int.	1.327	32			76
6th	3rd-High	1.76	33	3rd-Low	4.65	
5th	3rd-Int.	2.32	41			86
4th	2nd-High	3.27	33	2nd-Low	8.63	
3rd	2nd-Int.	4.33	51			100
2nd	1st-High	6.54	33	1st-Low	17.27	
1st	1st-Int.	8.68				

Optional Gear Ratios: Models 15-G-1120, 15-H-1120

Overdrive: .85, optional at extra cost
Overdrive: .74
Reverse: 5.06

Subsidiary of EATON Manufacturing Company

. . . for more details circle 310 on enclosed return postal card

People

Continued from page 39

conservation and highway work (including a new dust binder and erosion control specialty product and one for use in rejuvenating old, weathered asphalt pavements).

For the past seven years Mr. Vallerga has been managing engineer of The Asphalt Institute, Pacific Coast Division, and previously was on the civil engineering faculty of the University of California, with a background of varied technical experience. He is the author of numerous technical papers and a registered engineer in several western states.

Frank Mashuda

Frank Mashuda Heads Contractor Group

The Constructors Association of Western Pennsylvania with headquarters at Pittsburgh, has elected Frank Mashuda of Frank Mashuda Companies as president for 1960. Mashuda's headquarters are Milwaukee and Evans City.

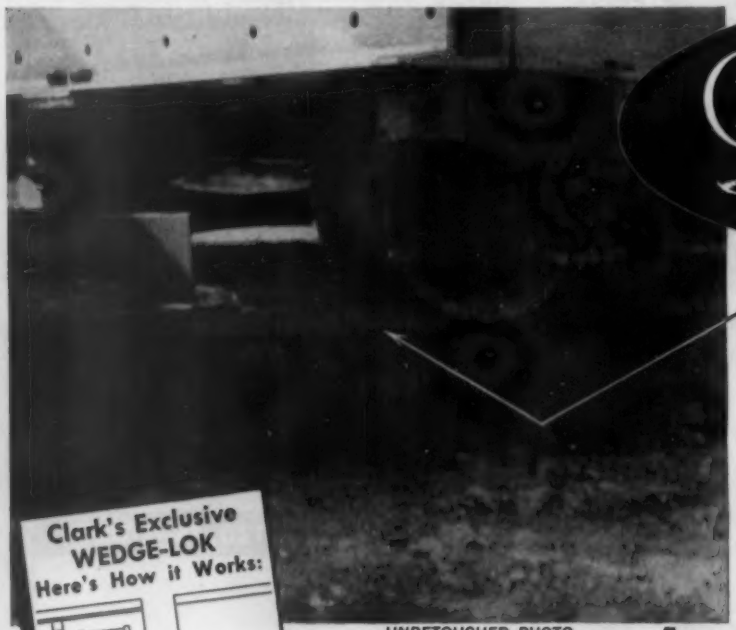
New vice presidents of the association are Logan Dickerson of W. P. Dickerson & Son, Hollidaysburg; Joseph B. Fay of Joseph B. Fay Company, Pittsburgh.

During the association's recent annual meeting the Frank Mashuda Companies was announced as first place winner in the association's Safety contest among firms having more than 200,000 man-hours of work reported for the year. The Casper Colosimo & Son of Pittsburgh won first award among companies in the 50,000-200,000 man-hour bracket, and George Vang, Inc. of Pittsburgh first in firms with less than 50,000 man-hours.

New Iowa Appointments

Three new major divisions have been set up by the Iowa state highway commission, under a new organization plan just adopted. This has resulted in the appointment of R. M. Tutton, to temporarily head the division of engineering, Carl F. Schach, in charge of the division of

Continued on page 49



UNRETOUCHED PHOTO

*PAT. PEND.

CLARK WEDGE-LOK PAVING FORMS

No deflection at the joint during load transfer

NOW! form setting time reduced to a minimum with Clark Wedge-Lok* the exclusive method of form joint.

See your local dealer for the complete Clark line of construction equipment.

CLARK INDUSTRIES

construction equipment division

375 EAST FIFTH AVENUE • COLUMBUS 1, OHIO

DIVISION OF CLARK GRAVE VAULT CO.

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NOW...430HP POWER B 'PULL*

All LW Distributors recently received this important message:

WESTERN UNION
TELEGRAM
W. P. MARSHALL, PRESIDENT

1201

SYMBOLS
DL = Day Letter
NL = Night Letter
LT = International Letter Telegram

CLASS OF SERVICE
This is a fast message unless its deferred character is indicated by the proper symbol.

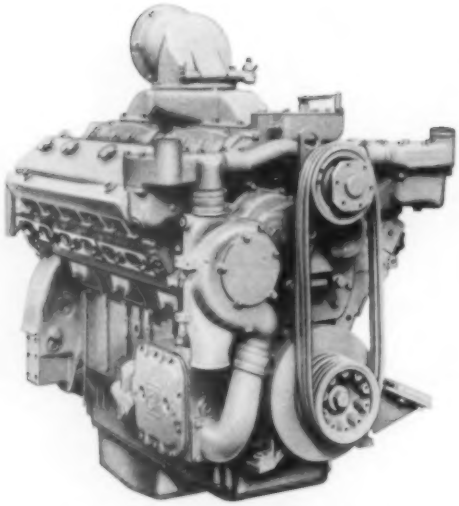
The filing time shown in the date line on domestic telegrams is STANDARD TIME at point of origin. Time of receipt is STANDARD TIME at point of destination

ATTN: ALL LW DISTRIBUTORS:
NEW 430 HP B TOURNAPULL NOW IN FULL-SCALE PRODUCTION. YOU CAN BEAT THEM ALL ON LOWEST-NET-COST-PER-YARD OR ANY OTHER BASIS. OFFER TO DEMONSTRATE ANYWHERE, IN ANY CONDITIONS, AGAINST ANY OTHER SCRAPER. YOU HAVE A WINNER=
LETOURNEAU - WESTINGHOUSE CO
PEORIA ILLINOIS=

LW

more power
more production
more profit

*Trademark



12V-71 GM engine is a 2-cycle, 12-cylinder unit producing 430 horsepower at 2100 rpm, maximum torque of 1210 ft.-lb. at 1200 rpm.

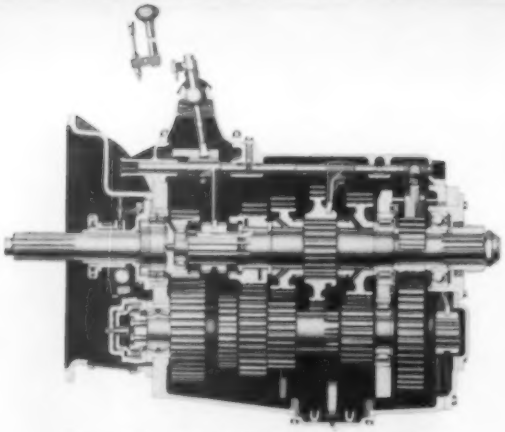
NEW POWER!

430 HP: to lick ANY job condition

NEW SPEED!

31.7 MPH + 2-speed steer for more cycles per hour

V POWER V B 'PULL



Easy-shifting Fuller L-1550 with LW High and Low Range is rugged, reliable; offers 10 speeds to 31.7 MPH, self-lubrication, pressure-filtration.

NEW CAPACITY!

23 yds struck, for more pay-yardage per shift

NEW STRENGTH!

Super-sized final drive for low upkeep, long life

Standard engine on the B Tournapull® is now the General Motors GM 12V-71, producing 430 horsepower at 2100 rpm. That's POWER! Power to pick up heaping payloads fast, no matter how tough the material. Power to get out of the cut *fast*, no matter how steep the grade. Power to *accelerate* faster, to chop off *minutes* from haul-time, and to return at *top-rated* speed.

Best power-to-weight ratio in its class

Every "horse" on the new V-Power "B" has to power only 320 lb of loaded weight. That compares to an average of 390 lb per horsepower among other single-engine scrapers in its size-class! You also get the best horsepower-per-struck-yard rating of any single-engine scraper on the market today. The V-Power "B" gives you 18.7 HP per yard, compared to an average of 16.2 among seven other scrapers in its range.

Even "hotter" than the V-Power "C"

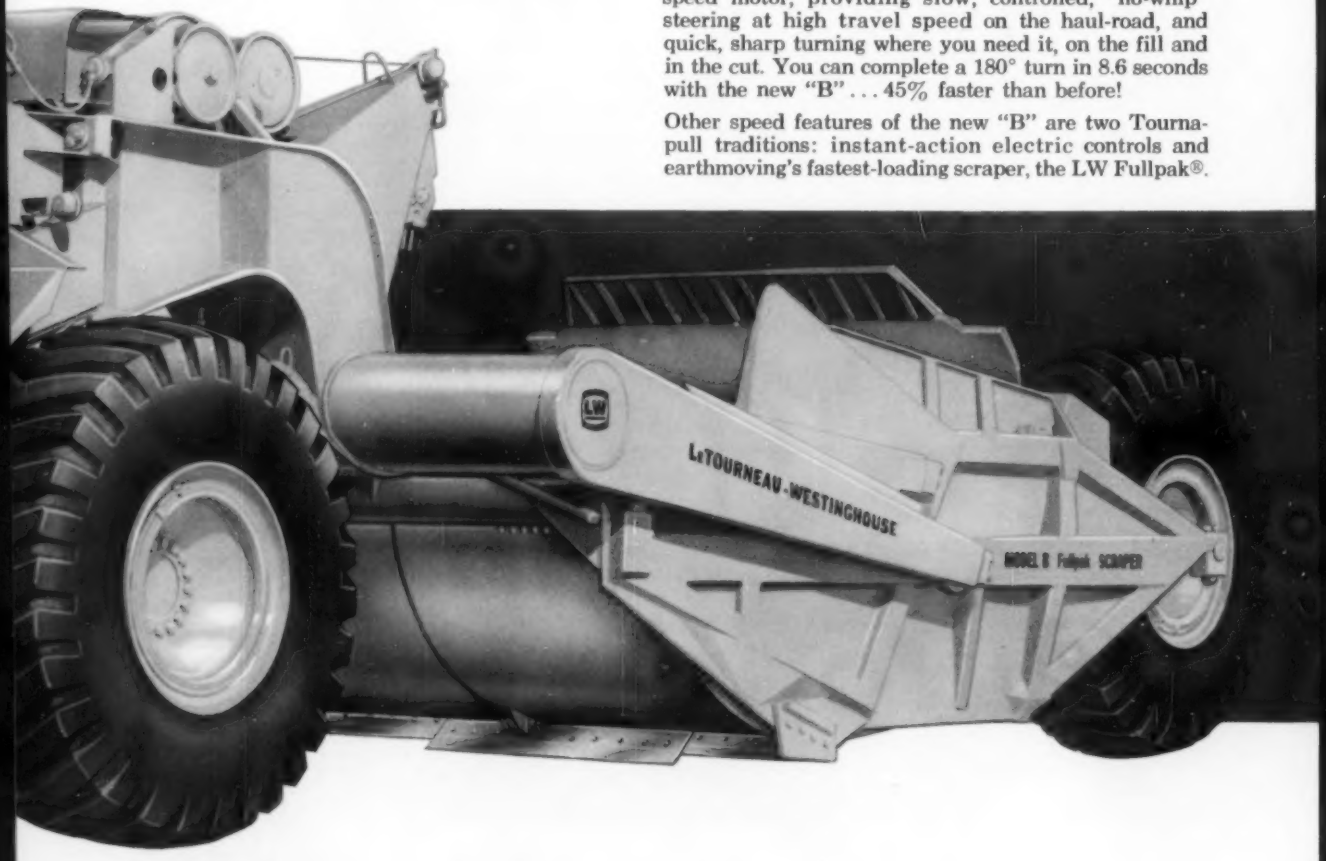
In the *medium*-sized scraper range, the LW V-Power C Tournapull has earned the reputation as the "hottest" powered scraper of all. V-Power "B" is even "hotter!"

Top speed on the new V-Power B 'Pull is now 31.7 mph. That's 3.6 mph faster — almost 13% — than the average of *all* other scrapers in the "B's" size-range. And with a *10-speed* transmission, your operator works faster on every phase of every cycle. In down-shifting, for instance, instead of having to drop down to a speed 4 or 5 miles slower, he need drop down to a speed only 2 or 2.5 miles slower. And he can "skip-shift" in either direction, anytime without double-clutching.

Controlled-steer on the haul; high-speed-steer on the fill

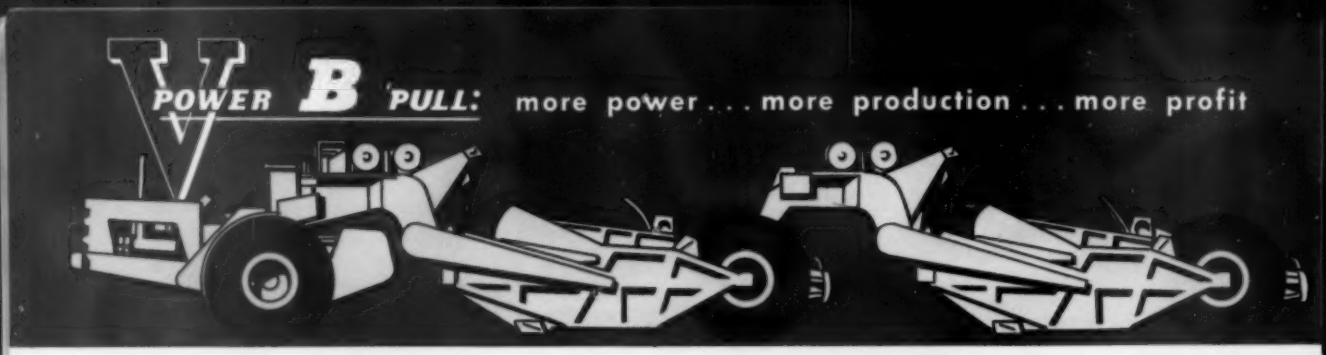
Another new speed feature of the V-Power "B" is a high-inertia steering motor. It has the effect of a two-speed motor, providing slow, controlled, "no-whip" steering at high travel speed on the haul-road, and quick, sharp turning where you need it, on the fill and in the cut. You can complete a 180° turn in 8.6 seconds with the new "B"... 45% faster than before!

Other speed features of the new "B" are two Tournapull traditions: instant-action electric controls and earthmoving's fastest-loading scraper, the LW Fullpak®.



Struck capacity of the V-Power B 'Pull's low, wide Fullpak scraper is now 23 cubic yards, with a heaped capacity of 29 cubic yards. Redesign of the B Fullpak has *in no way* altered the fast-loading, quick-boil features that have made Fullpak the industry's *most productive* scraper.

Final-drive gears on the V-Power B 'Pull are now *5¼" wide*... a full 40% larger than those available until now. The *entire* tooth surface is now heat-treated, and the "straight cut" design assures *maximum* load-bearing strength. No gearing in earthmoving is as simple or as strong! It's built for *rock-bottom* maintenance.



NEW TANDEM OPERATION

Add a second scraper in minutes ...move TWO LOADS EVERY TRIP!

With its 430-horsepower engine, the new V-Power B Tournapull lets you pull and operate *TWO* Fullpak scrapers with *one* prime-mover. After installation of the simple plug-in jacks, you can add or take off the second scraper *in minutes*. In materials where you usually add side-boards, you can now DOUBLE YOUR CAPACITY for the cost of a second scraper alone.

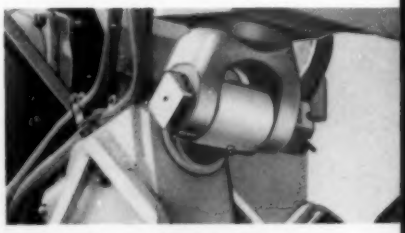
You save on operating costs: you're moving two loads with only one operator and with only little more fuel per shift.

You save on maintenance costs: you still have only one engine, one final drive, one transmission to maintain.

You save on pusher costs: you load both scrapers *faster* than one of the same total capacity (and with the *same* pusher-power you'd use for either scraper!).

You save on haul-road upkeep: pound for pound, there is *less* abuse of haul-roads than with single scrapers.

Plug-ins connect electricity and air-lines to second scraper. When these are connected, and king-bolt inserted into hitch, second scraper is ready for action!



Rugged universal-swivel hitch is pivoted over rear-axle of front scraper. You can perform any maneuver possible with single scrapers, with no jack-knifing. U-turns take only 20 to 25% more space than single units.

V-Power B 'Pulls are AVAILABLE NOW
At your LeTourneau-Westinghouse Distributor

Every LW Distributor is now ready to:

1. Give you full details on the V-Power "B", biggest profit-builder in earthmoving history.
2. Arrange for you to see one of these powerful units *at work*.
3. Take your order for prompt delivery, to your work-area . . . under terms that are as good as, *or better*, than you can get on any other major piece of earthmoving machinery.

We suggest you see *your* LW Distributor soon . . . to see how quickly you can start adding to your profits with the V-Power "B".

L.TOURNEAU LW WESTINGHOUSE

LETOURNEAU-WESTINGHOUSE COMPANY
PEORIA, ILLINOIS
A Subsidiary of Westinghouse Air Brake Company
Where quality is a habit

Litho in U.S.A. L.TOURNEAU-WESTINGHOUSE COMPANY, PEORIA, ILL. BP-2300-DC-4

People

Continued from page 44

planning, and James F. Hoag to the division of services.

Mr. Tutton's service with the commission dates from 1928. Mr. Schach advances from the post of safety and traffic engineer. Hoag was formerly electronic computing engineer.

Under a realignment affecting a number of posts in the organization, Howard E. Gunnerson advances from assistant head to head of the traffic and highway planning department of the commission.

Cochran Again Heads Clay Pipe Association

Member manufacturers of the Clay Sewer Pipe Association, Columbus, Ohio, have re-elected A. G. Cochran of Columbus, president. Hudson Hillyer of the Clay City Pipe Co., Uhrichsville, Ohio, was named vice president; and Mrs. Reva D. Smart of Columbus, was re-elected secretary-treasurer.

CSPA, a non-profit organization embracing 12 regional manufacturers, is a member of the National Clay Pipe Manufacturers, Inc., of Washington, D. C.

W. Otis Wright has been appointed state highway engineer of Nevada. He succeeds Edward L. Pine, who has resigned to take an executive job with Isbell Construction Company of Reno.

Wright comes to the top post following a long career with the department, having served for the last year as assistant highway engineer under Pine.

John Bawden and Reuben Eldredge have been appointed to newly created posts as deputy highway engineers.

William E. Dickinson, formerly vice-president and chief engineer of the Calcium Chloride Institute, has been elected executive vice-president, according to president George H. Kimber. In this newly created post Dickinson will assume responsibilities in administration and development of the programs of the Institute, and continue direction of engineering, research and activities of Institute field engineers.

Alfred W. Maner, recently assistant materials and tests engineer, Virginia department of highways, has joined The Asphalt Institute, College Park, Md., as headquarters staff engineer. As announced by Institute president J. E. Buchanan, he will be responsible for the preparation of technical Institute publications, and will also act as technical writing coordinator for manuscript revisions between Institute headquarters and field staff.

Ivar Van Akkeren has been appointed division engineer of the National Corrugated Metal Pipe Association, it has been announced by Roy E. Smith, managing director. Coming from the post of director of public works and city engineer of Oshkosh, Wisconsin, Van Akkeren will serve the Chicago-based association in Michigan and Wisconsin.

Anton H. Hayes, 30 year veteran in the Nevada state department of highways has been named administrative officer according to state highway engineer Edward L. Pine. He was for eight years a division engineer and more recently coordinator at Carson City.

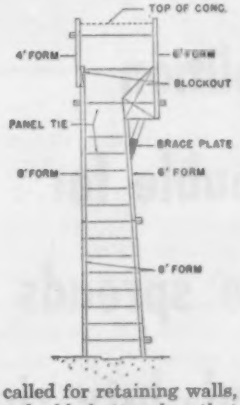
J. B. Stephenson has been made construction engineer of the Kansas state highway department. He has been chief engineer of the department's division office at Garden City and an employee of the department since 1933.

Battered Walls

Symons Forms on St. Louis Expressway

. . . Form Double Battered Walls 12" at Top, 3' at Base

On the downtown phase of the St. Louis Mark Twain Expressway, contractor R. B. Potashnick & J. S. Alberici Construction Company used 8,000 sq. ft. of Wood-Ply and 20,000 sq. ft. of Symons Steel-Ply Forms.



Job called for retaining walls, many of them double battered so that forms were angled to give 12" top thickness and up to 3' thickness at base. Heights varied from 4' to 34'. In addition, the forms were used to pour footings, abutments, piers and beams. Contractor obtained 30 re-uses.

Symons Forms may be rented with purchase option. Additional information on how to use Symons Forms for *battered walls* sent on request.

Symons

SYMONS CLAMP & MFG. CO.

4283 Diversey Ave., Dept. EO, Chicago 39, Ill.

MORE **SAVINGS** FROM **SYMONS**

. . . for more details circle 364 on enclosed return postal card

How exclusive clam-action 4-in-1's speed demolition ...double for whole spreads of limited-duty rigs!

International Harvester Company, Chicago 1, Illinois
Drott Manufacturing Corp., Milwaukee 15, Wisconsin

INTERNATIONAL®
DROTT®

Here's your 76-page cost a production estimating boo newest, most authentic and compl guide for estimating material-mov costs—and for selecting equipm combinations for top profits, a where! Yours for the asking fr your International Construct Equipment Distributor!

"One week with 4-in-1 beats all summer with previous rig"

—Jack Doub,
Raleigh, North Carolina

Grabbing heavy "Siamese-twin" stumps, this International® Drott TD-15 shows exclusive 4-in-1 clam-action "bite"—doing tough subdivision land-clearing work ordinary loaders can't touch! "The first week after the TD-15 Four-in-One took over, we burned more stumps than the previous inadequate equipment disposed of all summer," reports owner Jack Doub, Raleigh, North Carolina. "There's no other loader to compare with 4-in-1 versatility, especially in land clearing. The TD-15 Four-in-One has plenty of power, plus unmatched balance to handle full loads without nose-down or strain."

"4-in-1 cuts need for extra rigs ...saves costly hand labor, too"

—M & M Wrecking Co., Inc.
Richmond, Virginia

M & M Wrecking Co., Inc., are contract and salvage wreckers. Their TD-6 Four-in-One is used to demolish structures, level and rough grade afterwards, and load out reusable materials and rubble. Photo shows their 4-in-1 ready to load a steel I-beam which it has picked up with clam-action "bite." Unit also dozes the rubble into piles. "In our work no two jobs are alike, and bucket applications change on nearly every pass," states B. Nelson Mills, the wrecking company's secretary-treasurer. "The 4-in-1 has cut the need for added machines, and saves costly hand labor, yet does our work far faster than any method previously used."

"Clam-action 4-in-1 can 'bite' and bottom-dump hard-to-handle materials"

—John J. Duane Company,
Quincy, Massachusetts

"Our TD-20 Four-in-One does an efficient demolition job on all types of buildings," declares John Duane, for the wrecking company of his name. "The 4-in-1 bucket has many advantages in this type of work as it can 'bite' hard-to-handle materials by clam-action and bottom-dump into high truck bodies. We are clearing 50 acres of buildings in west Boston and have loaded out three-fourths of the rubble with the 4-in-1. It is a time-saver and money-maker for us." Picture shows Mr. Duane's 4-in-1 bottom-dumping into a high-sided truck. Even "impossible" conglomerations of wood-and-masonry rubble, that frustrate ordinary buckets and multiply disposal costs, can be loaded with amazing speed and economy with the clam-action 4-in-1!

Why limit your income, either on construction or demolition, to what an old-style "single-action" loader can earn you? Try the 4-in-1 machine actions shown here. Then try 4-in-1 power-shovel-like, pry-over-shoe excavating power. Then, 4-in-1 full-size bulldozing performance. And then, versatile 4-in-1 "carry-type scraper" grading-spreading abilities. Prove you get a whole equipment spread of actions—and each 4-in-1 action "doubles" for one or more specialized machines! See how exclusive, shock-swallowing Hydro-Spring adds operating comfort and prolongs equipment life. See your International Drott Distributor for a 4-in-1 demonstration!

. . . for more details circle 331 on enclosed return postal card

New Publications

Filler Metal Comparison Charts Revised

The American Welding Society announces the publication of a newly revised 8½" x 11" 48-page booklet containing the most complete set of welding rod and electrode comparison charts ever published. The brand names of 78 companies are listed. Fifteen AWS-ASTM specifications are involved and brands as well as manufacturer's names are contained in two indexes.

This second series of Filler Metal Comparison Charts prepared by the Society follows heavy demand from all over the world for the first publication. Previously it was difficult for a user of welding materials to determine the exact classification of a branded filler metal. With the aid of the Comparison Charts it is possible to see at a glance in which classification a filler metal belongs, irrespective of the brand name or number.

The importance of correct classification of brand names is brought out by the fact that 78 manufacturers of filler metal have submitted information for this issue, against the 60 who contributed for the previous issue.

These charts will prove invaluable to all who specify welding materials or are concerned with the identification of brands and classifications of filler metals. Copies may be obtained at $2.50 from The American Welding Society, Dept. T., 33 West 39th St., New York 18, N. Y.

Cold Weather Manual

The Navy has produced an engineering manual dealing with the problems of construction in extremely cold climates. Based on experience gained in arctic regions, the manual discusses the effects of very low temperatures on materials, theory of heat transfer, techniques of snow compaction and removal, and other findings for speeding construction and reducing costs in cold-weather jobs.

The illustrated manual, "Arctic Engineering," sells for $6 and may be obtained from the Office of Technical Services, Department of Commerce, Washington, D.C.

Maintenance Booklet for Unpaved Roads

A 36-page maintenance booklet "Maintenance Tips for Unpaved Roads," is available free on request

Continued on page 54

THE NEW HANCOCK ELEVATING SCRAPER
(Shown on John Deere 840 Tractor)
FORCED EJECTION • LARGER TIRES • NEW DRIVE
HEAVIER • MORE CAPACITY

Take advantage of these new features that are time and money savers for you! Forced ejection saves you operating time and manpower by providing a positive — controlled dump. Larger tires make the heavier, improved scraper more maneuverable. New, improved drive means heavier loads with less horsepower than ever before . . . 7½ yard and larger capacities. The new Hancock Scraper can be pulled with either the 830 or 730 John Deere, or similar industrial tractor, with front wheel dolly; or by direct connection to tractor. For "Engineered" help with your earth moving problems, contact Hancock today!

HANCOCK MANUFACTURING COMPANY
PO 3-8297 P. O. BOX 1359 LUBBOCK, TEXAS

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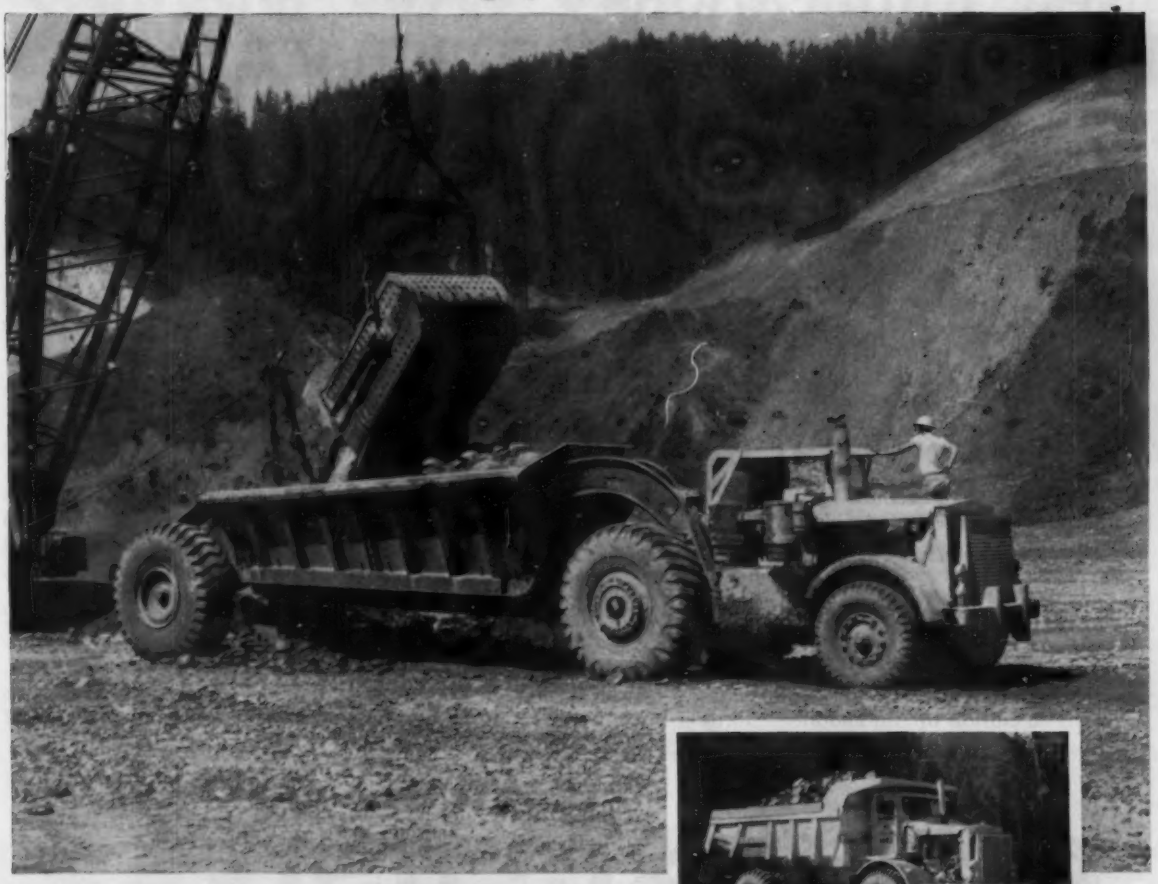
another earthmoving job...



another EUCLID *job!*

Hills Creek Dam, in western Oregon, is part of the Willamette Valley Project being built by the Corps of Engineers to provide flood control, navigation, power and irrigation. Scheduled for completion in 1961 this 11 million yd. earthfill embankment will be 2400 feet in length, 1600 feet wide at the base and 24 feet at the crest.

Low bidder on the earthmoving phase of this big job was a joint venture of Green Construction Co., Des Moines, Iowa and the Tecon Corporation of Dallas, Texas. These contractors are using a fleet of 28 big Euclids... twenty bottom-dumps of 17 and 30 yd. struck capacities and eight 22 and 27-ton capacity rear-dumps...to haul earth and rock fill to the dam site. The "Eucs" work two ten-hour shifts six days a week and have marked up an excellent record of high production and job availability.

With over 25 years of experience in building off-highway earthmovers exclusively, Euclid and its world-wide dealer organization offer a greater dimension in types and sizes of equipment that meet any job requirement. Your Euclid dealer can show you how advanced engineering and easier service-ability brings a greater return on investment.

EUCLID
DIVISION OF GENERAL MOTORS
Cleveland 17, Ohio
Euclid (Great Britain) Limited, Lanarkshire, Scotland

. . . a complete line of equipment for heavy earthmoving, mining, logging and many industrial operations . .

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New Publications

Continued from page 52

to the Calcium Chloride Institute, 909 Ring Building, Washington 6, D.C. Its purpose is to help patrolmen, maintenance supervisors, and engineers maintain unpaved roads for all-weather travel.

Separate sections deal with normal maintenance operations. Questions and tables are included. The specific maintenance procedures recommended for unpaved roads are the result of many years of field experience and laboratory research.

The Institute states the proper use of calcium chloride on a road will save about 75 percent of aggregate replacement and reduce blading costs; also give a compact dust-free year-around road.

Automobile Facts and Figures

New 39th edition by Automobile Manufacturers Association, 320 New Center Building, Detroit 2, Michigan. Contains 77 pages of statistical data. Free on request to users desiring information on automotive production, employment, vehicle registrations, traffic safety, automotive taxes, highway statistics and other such information.

HIGHWAY TRANSPORTATION LEGISLATION IN 1959. A summary of Federal and state activity, by the National Highway Users Conference, National Press Bldg., Washington 4, D. C. Copy available on request.

ENGINEERING STRUCTURAL FAILURES. By Rolt Hammond with a foreword by Sir Bruce White. Price $12.00. Philosophical Library, Inc., 15 East 40th St., New York 16, N.Y.

A comprehensive review in lessons learned in the failures in earthworks, dams, maritime structures, buildings, bridges, underground works, etc., with a discussion of vibration problems and welded structures related to failure history.

HIGHWAY ENGINEERING HANDBOOK. Editor-in-Chief, Kenneth B. Woods and staff of specialists. 1696 pages, 6x9, 452 illustrations, 260 tables. Price $25.00. McGraw-Hill Book Information Service, 327 W. 41st St., New York 36, N.Y.

This newly published handbook on highway engineering practice covers the field from financing, planning, and traffic operations to

Continued on page 58

TAMPO EXCLUSIVE!
NATURAL FREQUENCY VIBRATION
with VIBRA-METER

Brown & Blakeney, Fort Worth contractors use their Tampo vibratory roller on their state highway project near Arlington.

Only the Tampo vibratory roller can operate at the "resonant peak" or "natural frequency" of the particular material being rolled — by means of Tampo's exclusive VIBRA-METER. See the natural resonance frequency point on the VIBRA-METER dial and make roller adjustments accordingly for full compaction efficiency.

PATENT APPLIED FOR

Use of the VIBRA-METER keeps roller adjusted to the natural frequency of any material, any condition. Only Tampo's vibratory roller can give efficient compaction – because it vibrates at the proper frequency for a particular material to do the most work by natural frequency vibration.

TAMPO MANUFACTURING COMPANY

BOX 4248, STATION A • SAN ANTONIO 7, TEXAS

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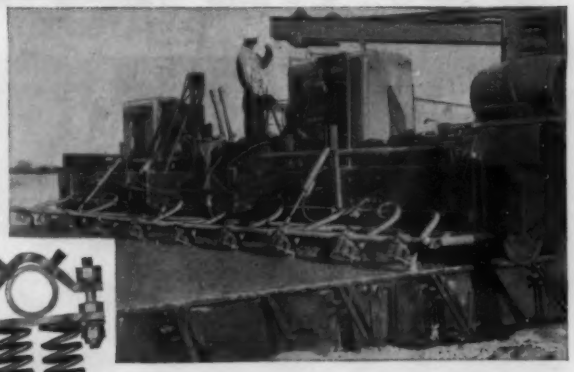
Contractor Saves $32,000 on ONE job! —with MAGINNISS VIBRATOR ATTACHMENT

Dale Benz, Inc. of Phoenix, Arizona, general contractor for the U.S.M.C. Supply Depot at Yermo, California, saved approximately one-half sack of cement per yard on 65,000 cu. yds. of concrete floor in the repair shops and pavement in the parking area.

This $32,000 saving was on concrete specifications which called for 5.8 sacks of portland cement per yard with approved internal vibration — or 6.3 sacks if internal vibration was not used.

On the Yermo job, the approved MAGINNISS Hi-lectric Vibrator Attachment was mounted on the concrete spreader. On jobs of limited runs between equipment moves, where a spreader cannot be used economically, the same Maginniss Attachment can be mounted on the concrete finisher in front of the front screed. There it will assist in spreading the mix, as well as perform its primary function of INTERNAL vibration.



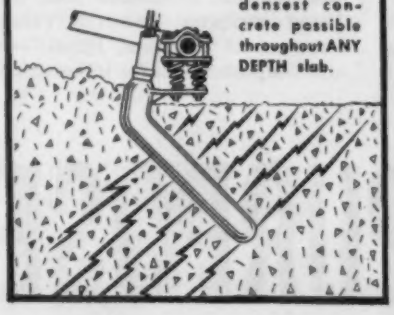
MOTOR IN HEAD... *packed with power!*

The MAGINNISS Vibrator has only two moving parts; no brushes, commutators, gears, flexible shafts, complicated air or fluid drive mechanisms to require costly repair or replacement. The 180 cycle induction motor—located in the vibrator head—is cooled by the surrounding concrete. The angled or horizontal positioning of the vibrators below the surface of the slab assures a uniform mixture of aggregate and mortar from base to surface regardless of depth. The MAGINNISS Vibrator handles the stiffest mixes easily.

You too can get improved quality and increased production on airports and highways, as well as structural jobs, with MAGINNISS Hi-lectric Vibrators. Fill out and return the coupon, or call your Maginniss Distributor—he's listed in 85 cities under "Contractors Equipment" in the Yellow Pages.

DEEP-PENETRATING VIBRATIONS

With MAGINNISS Vibrators, the vibrations travel outwardly at right angles from the vibrator head. Thus, by setting the heads at proper position — HORIZONTAL OR ANGLED — even distribution of the vibratory action is assured, resulting in densest concrete possible throughout ANY DEPTH slab.



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154 Distl Avenue, Mansfield, Ohio
RETURN THIS COUPON TODAY!

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- ☐ CONCRETE STREET, HIGHWAY, and AIRPORT PAVING VIBRATORS
- ☐ VIBRATORY SCREEDS
- ☐ STRUCTURAL VIBRATORS (180 Cycle Heavy Duty)
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MAGINNISS POWER TOOL CO.
Dept. RS-50, Mansfield, Ohio Date_____
Please send me literature on items checked at left.
Individual_____ Title_____
Firm or Dept._____
Street _____
City_____ State_____

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GET REAL PRODUCTIVITY

Ask Nick Pinello what he likes about the "Jimmy" Diesels in his earth-movers and he'll tell you "consistently more 'on-the-job' time." And that's just one reason why he picks GM Diesels when he's picking power.

For he'll also tell you his Tournapulls and "Twin C" pusher have racked up as much as 5,500 hours with "scarcely a day in the shop" and no major overhaul. That record is one reason Nick says this about engine parts, "We haven't begun to stock them."

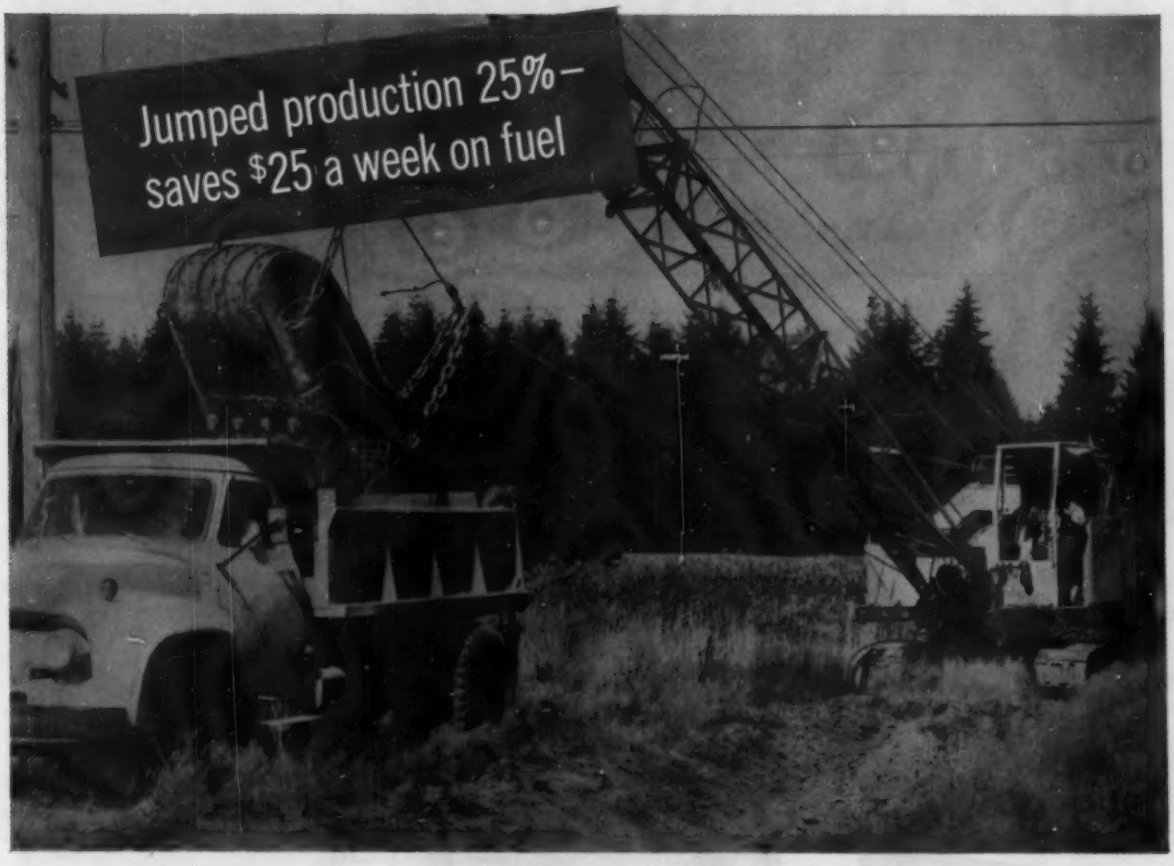
And it's a big reason why Pinello Construction is making such good time on the 1,700,000-yard grading job they're handling outside Colorado Springs. With equipment spending more time on the job—less time in the shop—the dirt's bound to move . . . fast.

This Colorado Springs company currently operates two "B" Tournapulls powered by turbocharged 6-110 "Jimmys," three "C" Tournapulls with "6-71's" and the "Twin C" pusher with two "6-71's." The units have given up to three and a half years' service.

Get GM Diesels in your equipment and you'll have units that spend more time *on* the job—make more money *from* the job. Proof? See your GM Diesel distributor—he's in the Yellow Pages under "Engines, Diesel"—or mail the postcard for full information.

GM DIESEL ALL-PURPOSE

GET A GM DIESEL ENGINE



Got a gasoline engine in your excavator? Want to save big money and boost production at the same time?

Then take a tip from Chehalis, Washington, contractors Beuter & O'Neil—they replaced the gasoline engine in their Lorain TL-25 with a 4-53 "Jimmy" Diesel.

They're saving $5.10 a day in fuel—getting 25% more work per shift. What's more, the "Jimmy" has ended engine stalling on the job—has "lots of guts" according to the operator, who says he "can't kill it on idle."

And Beuter & O'Neil also say, "We like particularly the fact that the shovel can now pick up heavy stuff at an idle—it doesn't tear the bucket apart. Open throttle with the previous gas engine raised cain with the machine. Now we can hook out riprap at an idle—something we couldn't do with the other engine."

With savings and performance like that, Beuter & O'Neil figure their GM Diesel will pay for itself in less than a year—a bargain any way you figure it. You may do the same thing if you repower with a "Jimmy." Proof? See your GM Diesel distributor—he's in the Yellow Pages under "Engines, Diesel"—or mail the postcard for your GM Diesel Operating Cost Computer today.

GM DIESEL

DETROIT DIESEL ENGINE DIVISION,
GENERAL MOTORS, DETROIT 28, MICH.

In Canada: GENERAL MOTORS DIESEL LIMITED, London, Ontario
Parts and Service Worldwide

POWER LINE sets the standard of Diesel productivity

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DELMAG

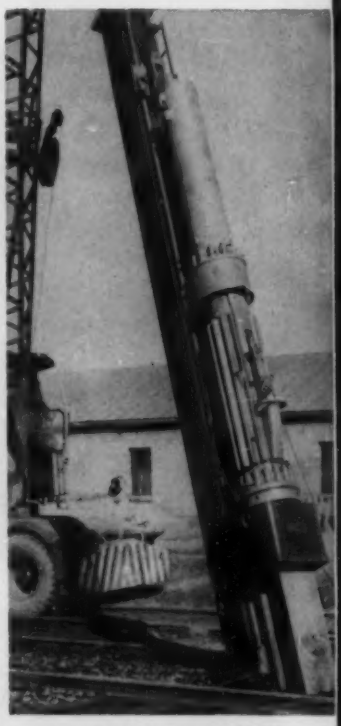
DIESEL PILE HAMMERS

for top performance

LOWER OPERATING COSTS

Engineered for top performance, Delmag Diesel hammers provide many exclusive, advanced features that contribute to their tremendous popularity. Weighing less than comparative hammers, they give you more ft.-lbs. for each pound of weight than any other hammer on the market today. Compactness, simplicity, plus all-weather adaptability make for greater economy.

See how Delmag, oldest and most experienced makers of Diesel hammers helps you to cut your operating costs.



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Three Models Available:

D-5
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D-12
22500 Ft. Lbs.

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Illustrated literature sent on request.

The Foundation Equipment Corp.,
100 Elizabeth St., Newcomer'stown, Ohio.

Martz Machinery Co.,
988 Market St., San Francisco 2, Calif.

Andrews Machinery of Washington Inc.,
3633 East Marginal Way, Seattle 4, Wash.

Special Construction Machines, Ltd.,
166 Bentworth Ave., Toronto 19, Ont.

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Publications—

Continued from page 54

design, construction, maintenance, and landscaping. In 28 sections prepared by 47 leading authorities, it treats such topics as route selection and layout, finance and administration, soil mechanics, testing, highway materials, basic highway design, rigid and flexible pavements, and other important topics.

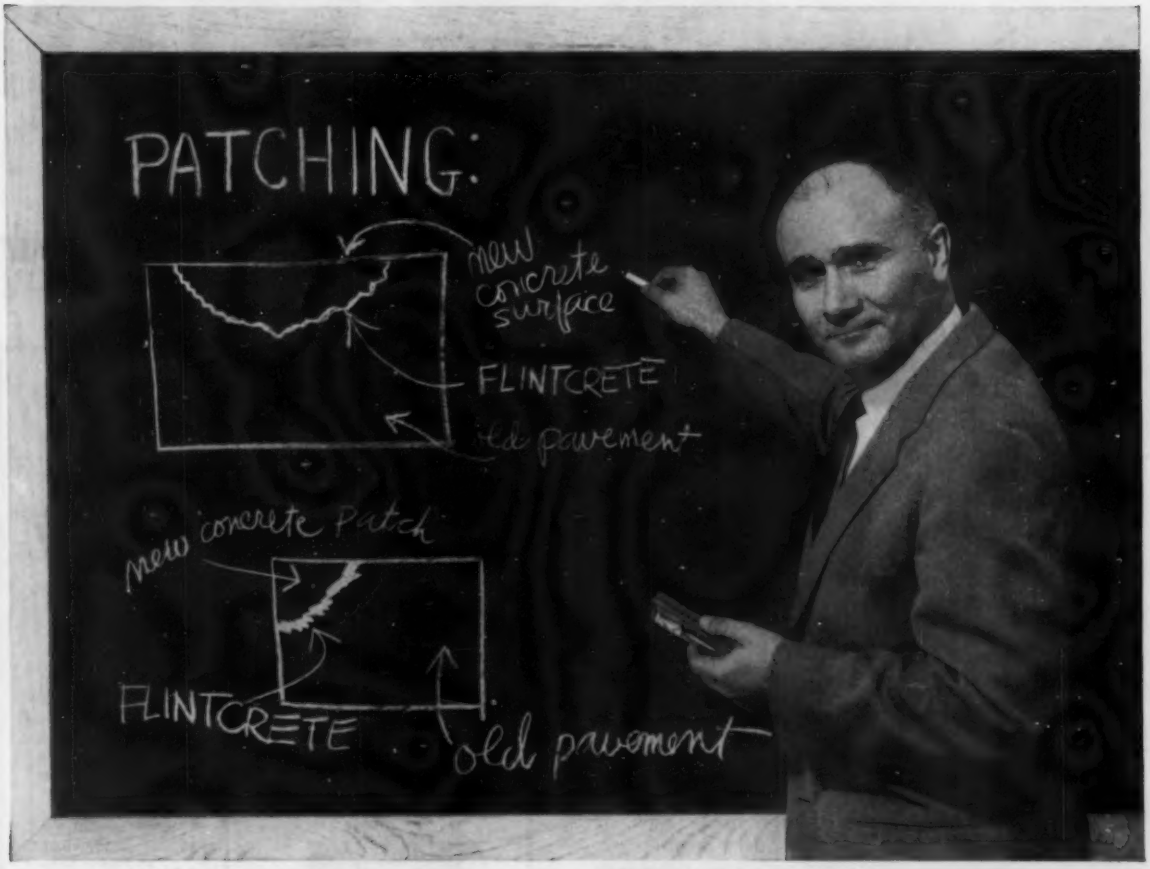
Practical guidance is given on urban transportation planning; the use of digital computers; acquisition of right-of-ways; seismic and resistivity techniques; design of foundations, embankments, and cut slopes; drainage for highways and airports; contracts and specifications; distribution, production, and engineering characteristics of aggregates; soil stabilization; and many other subjects is included in the coverage.

"CALCIUM CHLORIDE FOR UNPAVED ROADS," (Brief SB-2) is a summary of the benefits of calcium chloride, and a guide to its uses. It includes year round maintenance procedures, a description of a typical calcium chloride road, and a comparison of routine maintenance and calcium chloride maintenance. For a free copy of Brief SB-2, write to the Calcium Chloride Institute, 909 Ring Building, Washington 6, D.C.

MODERN SURVEYING FOR CIVIL ENGINEERS. By Harold Frand Birchel. Price $15.00. Philosophical Library, Inc., 15 East 40th St., New York 16, N.Y. This new edition contains 28 chapters covering all aspects of the field including aerial surveying.

LANDSLIDE AND FOUNDATION INVESTIGATIONS AND STABILITY ANALYSIS. Bulletin 236. Highway Research Board, 2101 Constitution Ave., Washington, D.C. Price: $1.20. This 68-page bulletin contains three papers on these subjects as presented at the Board's 38th annual meeting (January, 1959).

Chalk talk by paving specialist "Bob" Snyder on Flintcrete—
Flintkote's amazing new polysulfide/epoxy bonding compound...



"It's a fact! New Flintcrete* lets you do concrete patching never before possible."

"The secret's in Flintcrete's bonding power. It can bond concrete to concrete in a 'weld' up to 12 times stronger than concrete itself.
"This extremely high bonding strength really pays off when you're preparing existing concrete surfaces for repair. It's not necessary to remove the slab; only the unsound area need be cut away. And be certain you use a quality compound—the right one for the job at hand."

Flintcrete can be used for a wide range of other jobs too:

- bonding overlays to existing concrete surface
- bonding precast materials, markers, refractory brick
- skid-proofing pavements
- surface sealing

We'll put you in touch with a qualified distributor or one of our Flintkote paving products representatives. He knows our full line and can help you.

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FLINTKOTE

Manufacturer of diversified products for home and industry.

Send today for complete technical literature giving grades available, application techniques and uses. Write: **The Flintkote Company, Paving Products Section, P. O. Box 157, Whippany, New Jersey**

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interchange this ...get 3 to 7% higher

Segmented roll is easily field-mounted on any Buffalo-Springfield tandem . . . gives you more uniform compaction . . . higher densities per pass

A quick-change of guide rolls and you combine the special advantages of a projecting-lug roll — plus those of a smooth-faced roll — all in a single pass! Result: Up to 7% higher compaction densities on stabilized base-materials, crushed or broken stone, hot and cold bituminous mixes, earth-fills.

IN OTHER WORDS . . .

For any Buffalo-Springfield tandem roller, new, or in the field, your small investment in segmented-roll attachment virtually gives you two machines in one. You convert to segmented guide-roll for faster higher-density compaction . . . switch back to smooth-faced roll as job requirements demand. You *tailor* your machine to the job . . . meet specs faster and more profitably.

If you're interested in this flexible approach to more profitable rolling, send coupon for new 6-page bulletin. It tells the full story!

BUFFALO-SPRINGFIELD COMPANY
SPRINGFIELD, OHIO
(Division of Koehring Company)

Send complete information on profit opportunities with segmented rolls.

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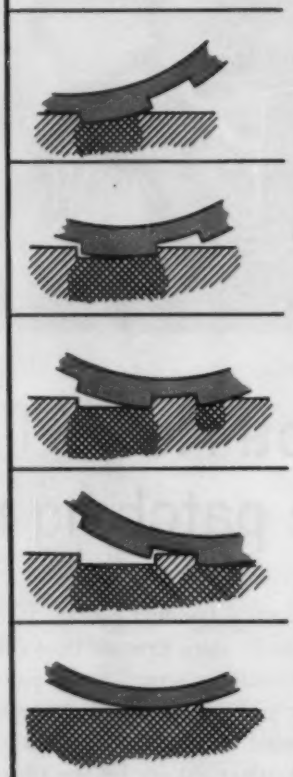
BI RS

HOW SEGMENTED ROLL GIVES GREATER, MORE UNIFORM DENSITIES



Segmented pads enter vertically, with practically no lateral displacement of surface material. There's no build-up of material ahead of roll.

Spacing between staggered pads results in more compaction weight per unit of contact area. Compactive effort is from lower elevation up . . . results in more uniform top-to-bottom compaction.

Broad-faced special designed pads make clean exit . . . eliminate fluffing up of surface material, as occurs with lugs of sheepsfoot roller.

Because of bulb-shaped compactive effort, area below surface is knit tightly together in pattern of uniform density.

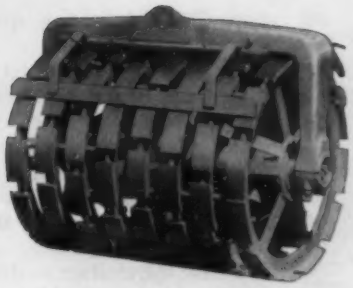
Follow-up action of smooth-faced drive roll easily takes care of shallow, web-shaped areas not compacted by segmented pads. (See photo next page.) End result: smooth surface, with uniform high-density compaction underneath.

The right roller for you

Portable tandems

Two-axle tandems

with this



compaction densities

SEGMENTED ROLL is faced with staggered rows of heavy steel pads . . . applies pressure in foot-print pattern. Roll is split in two free-rolling sections to minimize surface scuffing when making turns. To fit your needs for permanent or interchangeable use, they are available with or without separate axle and/or yoke.

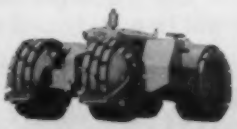
TWO AXLE TANDEM with segmented roll works on airport project in Ohio. With one machine and one operator, this contractor combines advantages of both crawler-drawn sheepsfoot roller, and conventional tandem roller . . . all in a single pass.

THREE-WAY COMPACTION ON EVERY PASS is achieved here, compacting sub-base for airport runway in Columbus, Mississippi. Three-axle Buffalo-Springfield roller above uses segmented lead guide roll, vibratory center guide roll, followed by smooth-face drive roll.

3-wheel rollers

Pneumatic rollers

K-45 Kompactor



3-axle tandems

3-axle vibratory

BUFFALO-SPRINGFIELD COMPACTION EQUIPMENT • FLAHERTY SPREADERS AND SWEEPERS • STARDRILL-KEYSTONE DRILLING MACHINES

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Have You the Courage to Be a Good Boss?

By Ross G. Henry

Training-in-Service Engineer
Montana Highway Commission

It is a most complimentary and gratifying feeling, and gives one a sense of personal worth and accomplishment, to be made a supervisor. However, we soon find the job is not a place to bask in reflected glory. It definitely is no bed of roses. It takes courage, organization ability, and good sound reasoning to be a good supervisor.

At first we have visions of all of our subordinates liking and respecting us and anxious to do our slightest bidding. We soon find that this condition very rarely exists and is almost impossible to bring about. It would be nice to have a responsible position without having to assume the responsibility that goes along with the position.

If you desire to become, or now consider yourself a good supervisor, ask yourself the following questions:

Do you have the courage to let go of your specialty and begin to manage? Rather than suffer the frustrating experience of correcting someone else, it is often easier to shove him aside and do the job. It takes courage to forsake *doing* and start *directing*.

Do you have the courage to delegate authority, and accept blame if something goes wrong? Your subordinates must do their share of the work. They must also be given authority commensurate with the responsibility necessary to do the job. It takes courage to accept responsibility for work done by your subordinates, particularly mistakes.

Do you have the courage to recommend promotion for the best qualified men? Some supervisors are reluctant to recommend advancement for highly qualified personnel, for fear these men will become a threat to their own jobs. It also takes courage to listen to an employe when he disagrees, and if he is correct, it takes real courage to admit it.

Do you have the courage to communicate to your subordinates an unpopular decision, without blaming it on those above you? Anyone hates to be unpopular, particularly when it results from enforcing a decision made by higher authority. It also takes courage to accept the results, if you made the decision, and not to imply the decision originated elsewhere.

Do you have the courage to tell an employe his work is unsatisfactory, and to sit face to face with him when you make a merit rating, discuss his shortcomings and indicate he must improve if the merit rating indicates? It takes courage to do these things with an open and impartial mind.

Do you have the courage, after repeated attempts to get an employe to improve, to take what unfavorable action may be necessary and justified? It takes courage to accept his responsibility—rather than continue to issue satisfactory merit ratings and hope the trouble will go away, or try to transfer the

Continued on page 64

EQUIPMENT HAULING *the easy way!*

HAUL MEDIUM WEIGHT CONSTRUCTION EQUIPMENT, PORTABLE BUILDINGS, TOOLS, AND MACHINERY EASILY AND ECONOMICALLY

SCHWARTZ

RAMP HOIST
WITH WINCH

- Fits all trucks 84" to 154", cab to axle.
- Hydraulically operated with controls at the side of the ramp.
- Mounts without removing truck frame cross member.
- Load rating—up to 12 tons.
- Rugged power hydraulic winch operated off truck power take-off.
- Available with wood or steel platform with steel approach plate and steel cab protector.
- Hinge point located over rear spring shackle for better stability and less stress on truck frame.

AVAILABLE ALSO IN HEAVY DUTY MODELS FOR TANDEM AXLE TRUCKS

SCHWARTZ MAKES IT A **ONE-MAN** JOB!

Now, with a SCHWARTZ RAMP HOIST, *one man* can load, transport, and unload those hundred and one pieces of equipment that do not justify the use of heavy duty low-boy trailers. With the ramp lowered, both mobile and other equipment can be winched onto the ramp and safely transported. The low cost of the SCHWARTZ RAMP HOIST will be quickly paid for in savings on time and labor.

WRITE TO DEPT. RH-15 for complete information.

SCHWARTZ

SCHWARTZ MANUFACTURING COMPANY
Lester Prairie, Minnesota

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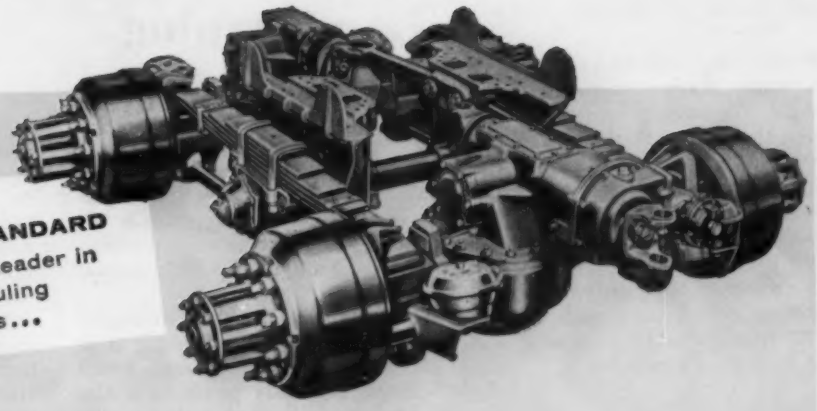


ROCKWELL-STANDARD
Acknowledged Leader in
Rugged Hauling
Operations...

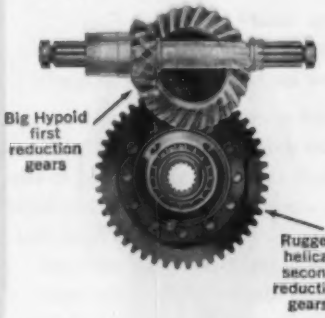
Here's why Timken-Detroit®

DOUBLE-REDUCTION TANDEMS LEAD IN TOP PERFORMANCE—LONG LIFE!

Timken-Detroit Heavy-Duty Tandems with Hypoid Helical Double-Reduction Gears are the big favorites for top performance and long life.
Here are some of the reasons why:

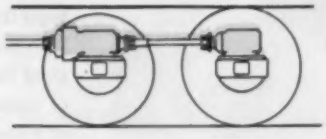
Rugged Hypoid-Helical Double-Reduction Gearing!

Balanced gearing—with two full-sized gear sets working in series to take an equal share of the load—provides a stronger power train with balanced gear set loadings and the widest range of ratios.



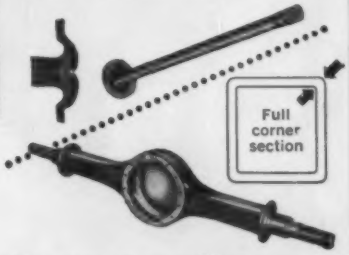
Driver Controlled Interaxle Differential!

Allows differential action between the axles to compensate for worn or mismatched tires. Both axles do equal amounts of work . . . can be disengaged at any speed, giving positive through drive when better traction is needed. *Straight-Line Through Drive* eliminates prop shaft angularity . . . increases bearing and gear life, reduces maintenance.



"Torsion-Flow" Axle Shafts and Hot-Forged Housings!

More splines, Torsion-Flow forging, and patented heat-treating processes make Rockwell-Standard shafts the toughest in the industry. Housings are hot-forged from high carbon steel, and are rectangular shaped with full strength corners for greatest strength with minimum weight.



Timken-Detroit Double-Reduction Tandems come in a wide range of capacities—6 models from 34,000 to 65,000 pounds.

Another Product of... **ROCKWELL-STANDARD CORPORATION**

Transmission and Axle Division, Detroit 32, Michigan

. . . for more details circle 354 on enclosed return postal card

Continued from page 62

employe and unload your troubles on someone else.

Do you have the courage to accept the good with the bad? There are many things in the life of a supervisor which are pleasant and gratifying. However, part of the job is hard and disagreeable. Learning the techniques of supervision is a waste of time unless you have the fortitude to do the job. It takes real courage to perform well and to be a good supervisor.

Highway Bills Passed

Kentucky lawmakers have enacted a bill providing for a November vote on a $100 million bond issue, of which $90 million would go for highway construction.

Also enacted were two other bills to clear the way for broadened use of toll financing for state highways. They empower a turnpike authority to issue bonds for the construction of toll highways, to be leased to the state under conditions designed to amortize the bonds.

Landscaping

Mower Blades Coated For Longer Service

A new method of hard-coating aluminum power mower blades gives promise of longer blade life and better performance in the trimming of median strip and roadside grass.

Developed by Toro Manufacturing Corp., the new technique is an aluminum anodizing process which electro-chemically produces a film of extremely hard aluminum oxide on the surface of the metal. It requires one minute to produce an average coating thickness of 1/1000 in. (1 mil). To produce the same thickness by conventional process is said to require from 10 to 50 minutes.

In concentrated densities, the aluminum oxide film has the ability to withstand abrasions greater than that endured by hardened steel, it is said.

Toro company engineers became interested in the field of hard-anodizing because the cutting unit of the standard reel mower must remain in perfect alignment to give satisfactory mowing performance, and stones or similar objects can put the cutting unit out of adjustment. A hard-coated aluminum reel was developed, but by using conventional hard-coating methods, mass production of the new cutting units was unrealistic. Each reel had to be immersed in an electrolyte bath for from 10 to 50 minutes to achieve the thickness required for protection.

Staff engineers from the company's research and development center were assigned to find a faster method of hard-coating aluminum. After four years of design and testing, the technique of coating a surface 1/1000 of an inch in one minute was achieved.

Characteristics of the new coatings are said to be similar to those produced by slower methods. Comparative tests prove, it is said, that they are essentially the same as to hardness, abrasion resistance, fric-

Continued on page 69

Gritty mud would mar the markings on most tapes!

This Chrome Clad® tape is Lufkin's 50-foot ANCHOR model. It *looks* quality in its hand-sewn leather case . . . it *is* quality.

A special kind of electroplating protects the tape from the damage of mud, sand and grit. The bold black markings are bonded to the steel base . . . protected by layer after layer of electroplating . . . topped by a final coat of tough chromium. Glare free, corrosion resistant, longer lasting—this is the tape preferred by every professional. Available with markings in feet, tenths and hundredths.

THE LUFKIN RULE COMPANY
TAPES · RULES · PRECISION TOOLS

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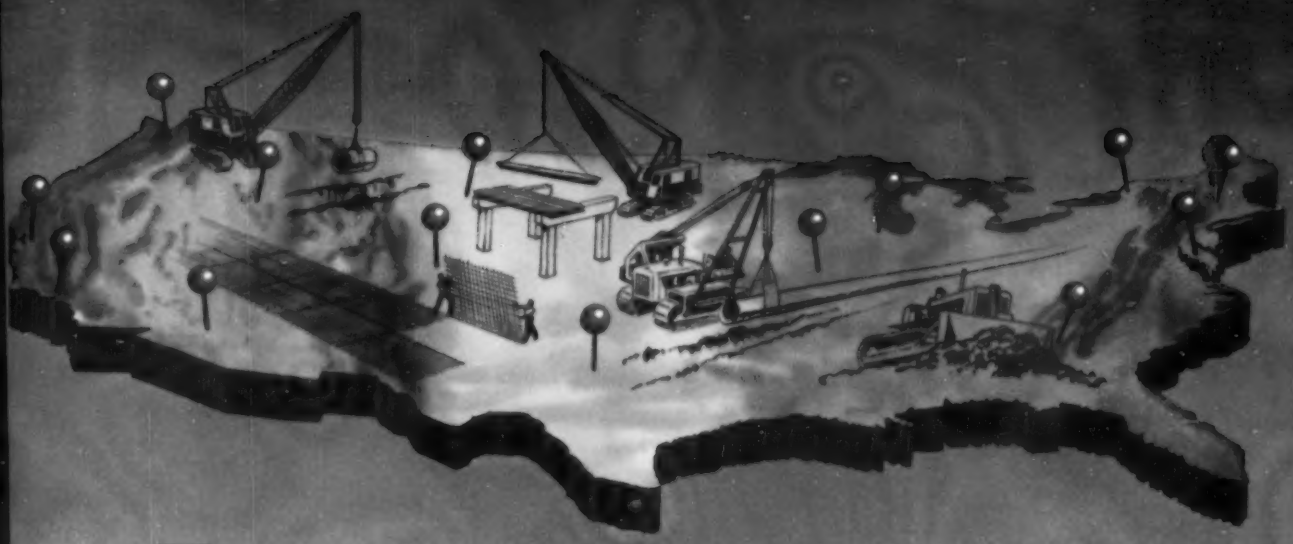


It's a big country...

. . . and the construction industry is one of the biggest in it. On job-sites anywhere in this broad land, contractors can count on prompt delivery of CF&I steel construction products. This is one of the meanings behind the Image of CF&I.

CF&I's steel mills and plants, sales offices and warehouses can furnish you with a wide range of quality steel products. No matter where you are, there's a CF&I plant or warehouse to serve you.

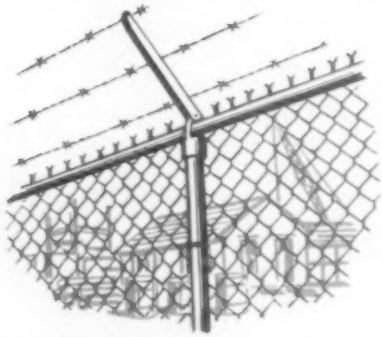
Today, the practical contractor avoids "bargains" offered by foreign steel producers. Instead he prefers the *extra* benefits offered by nationwide steel companies like CF&I. The lasting dependability of all CF&I products, plus expert engineering assistance when needed, are just two benefits that more than offset the lower price of imported steel.

On the following pages, you'll see a number of CF&I steel products in action, helping to get construction jobs done safely, swiftly and economically.

CF&I STEEL

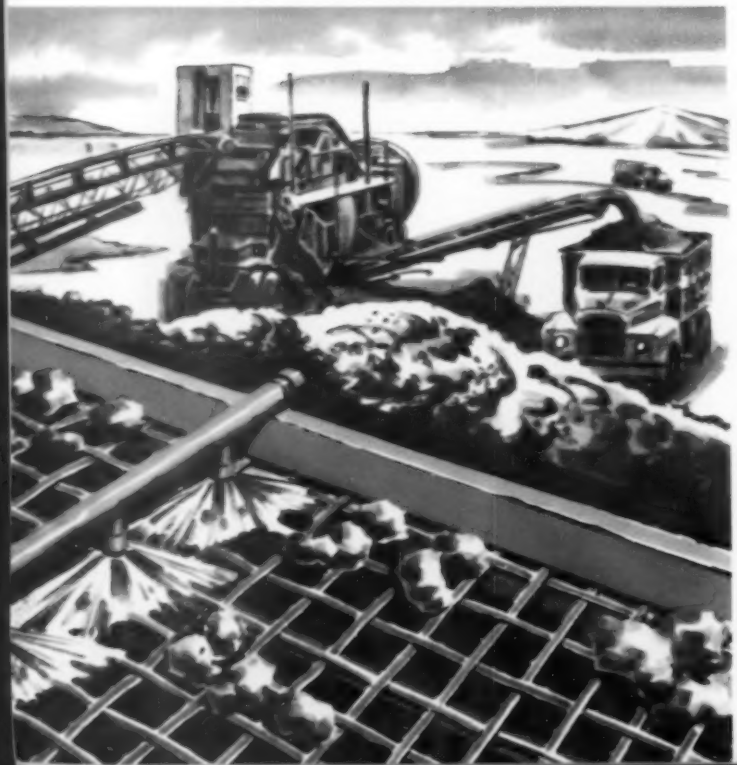
CF&I Steel Products

GRADER BLADES: All CF&I Grader Blades and Cutting edges are tough, give long, trouble-free service, and are available for quick delivery. Made of special analysis steel, CF&I Blades come in a complete range of lengths, widths, thicknesses and hole spacings to fit virtually all earth-moving equipment.



CHAIN LINK FENCE: A sturdy CF&I Realock Fence assures positive protection for buildings, property and storage areas. Steel fabric is heavily galvanized after weaving to resist rust. Realock Fence is ideal for right-of-way installations.

SPACE SCREENS: CF&I can supply space screens "tailored" for the specific results you require—high tonnage per hour, accurate screening, resistance to abrasion or fatigue. CF&I Space Screens are supplied in a wide range of weaves, openings, specifications and edge preparations.



TIE WIRE: CF&I Cal-Tie Wire — used in a handy, lightweight reel — is the safe, easy way to tie reinforcing. Avoid the wastes and dangers of working with clumsy shoulder coils by using Cal-Tie in belt-borne dispensers.

for construction use

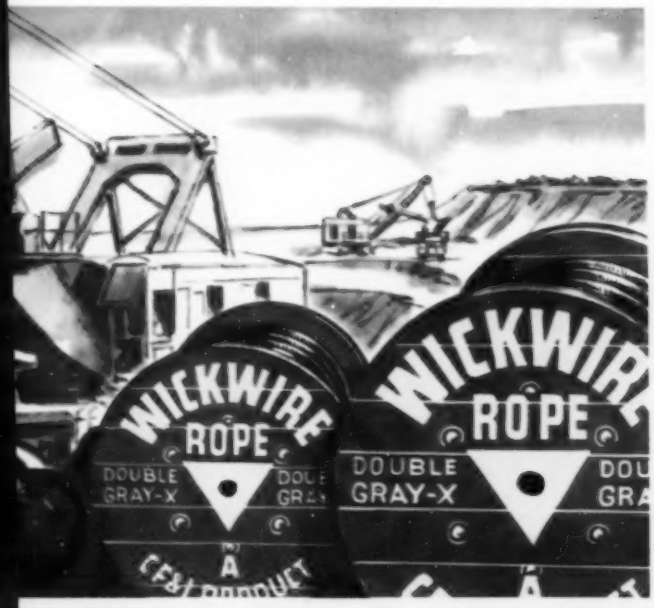
The steel products* shown on these pages are made by CF&I for all types of construction — from highways and runways to dams and other concrete structures. You save time and red tape when you order these and other steel "tools of your trade" from CF&I, a modern steel company serving the construction industry.

***Other CF&I Steel Products for the Construction Industry**

Galvanized Steel Strand • Grinding Rods • Grizzly Bars • Merchant Bars and Shapes • Nails and Staples • Rebars • Rock Bolts and Metallic Fabric • Screen Bars • Structural Shapes • Stucco Netting • Welded Steel Pipe • Wire Rods

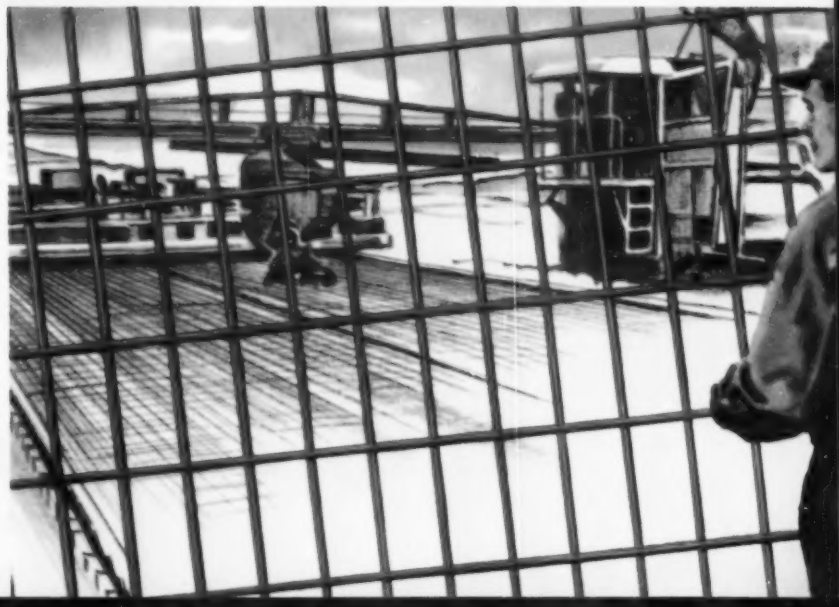
For complete information ask for Catalog G-104, "CF&I Steel Products for the Construction Industry."

PRESTRESSED CONCRETE STRAND & WIRE
For pretensioning of prestressed concrete members, CF&I makes a quality 7-wire strand that is stress-relieved after stranding for increased elasticity. CF&I also produces a high-grade prestressed concrete wire recommended for post-tensioned prestressed concrete structures.



FABRICATED STEEL PLATE: CF&I's Claymont plant has facilities to produce a wide variety of fabricated plate products for structural use in all shapes, sizes and gages, from carbon, alloy or stainless-clad steel. Prompt delivery is also assured on welded steel girders.

WIRE ROPE: CF&I offers a line of safe, dependable wire ropes in many sizes, constructions and grades. You can choose a rope that best resists abrasion, bending, fatigue or crushing. For extra strength and extra-long rope life, specify our new Double Gray-X. CF&I-Wickwire Wire Rope is furnished through a network of distributors for swift delivery to any job site. Complete line of Wire Rope Slings also available.



WELDED WIRE FABRIC: CF&I-Clinton Welded Wire Fabric is ideal for reinforcing all concrete structures — buildings, highways or pipe. Easy to use and store. Made in rolls or mats.

CF&I's Colorado steel-producing plant makes many steel construction products.

Southwestern customers receive prompt service from this combination warehouse and sales office in Texas.

Serving the heavy industrial areas of the east and mid-west is CF&I's mill in upper New York State.

A glimpse of CF&I . . .
serving the nation
. . . serving you

Typical of CF&I's modern steel service centers is this one in Illinois.

When you need steel construction products, swift delivery is important. CF&I's mills, steel service centers and sales-service offices are located across the country, only hours away from any construction site. They can furnish you with steel products and technical assistance in a hurry. Look to CF&I when you want dependability—both in product and in service.

Specialty wire products are made at CF&I's Massachusetts plant.

A leading producer of prime steel plate and plate products is CF&I's Delaware plant.

Contributing to the growth of the west are CF&I's California plants.

THE COLORADO FUEL AND IRON CORPORATION

DENVER • OAKLAND • NEW YORK

CF&I STEEL

Landscaping

Continued from page 64

tional properties, corrosion resistance, electrical resistance and density.

Among advantages claimed for the new process:

(a) Coatings are lighter in color, making the material more receptive to a wider range of color with various dyes.

(b) Coatings can be applied substantially faster with resulting savings in time.

(c) The technique broadens applications of aluminum.

Roadside Planting Test Program Continues

The Michigan state highway department is in the midst of an experimental roadside planting program designed to make the state's highways safer and attractive.

In the past two years, more than 10,000 trees and plants—including 3,500 evergreen trees, 2,000 shade trees, 3,000 flowering trees and 1,600 shrubs—have been planted along many of the state's newer highways.

The plantings serve a dual purpose, according to highway commissioner John C. Mackie. "They are designed to provide an added safety measure on the highways and the beauty of the trees and shrubs will be a delightful added bonus for motorists," he said.

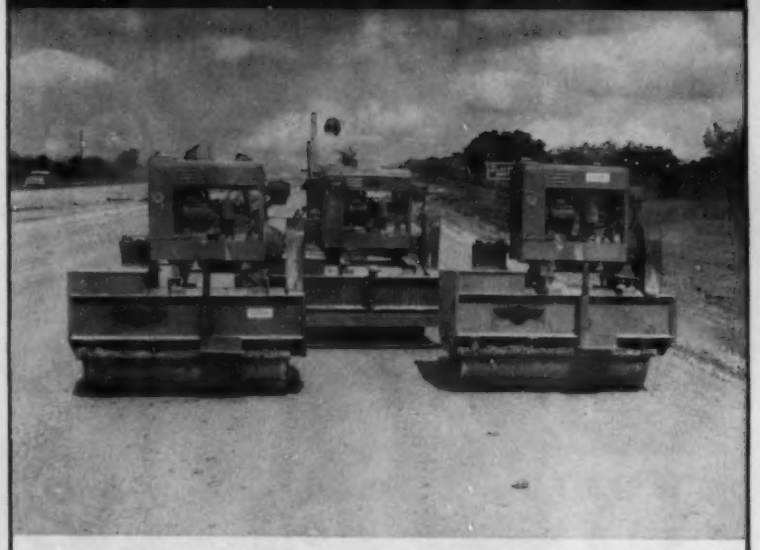
In rural areas plantings are used to outline hills and curves and introduce vertical dimensions which reduce the fatiguing atmosphere of long stretches of highway. The plantings also cut down the headlight glare of oncoming traffic. In urban areas, the plantings are planned to isolate the highway from adjacent residential developments and muffle traffic noise.

A variety of plantings is used depending on soil conditions. Austrian and Norway pines are primarily used for evergreens; Norway maple, ash, pin oak and thornless locusts for shade; and the flowering crabapple and thornapple for flowering trees.

Design of many of state's new expressways calls for an alignment that will preserve natural forest growth in the center mall where economically feasible.

ESSICK

VIBRATING COMPACTORS



COSTS DOWN—COMPACTION UP!

WITH ESSICK 54" VIBRATING COMPACTOR

CONTRACTOR REPLACES EQUIPMENT WORTH $67,200 AND DOUBLES PRODUCTION RATE—WITH HIGHER DENSITIES—FEWER PASSES—HIGHER LIFTS

On Texas State Highway 180, Fred Hall & Sons Contractor, were using two Model M tractors, three 10 ton pneumatics, one 3 wheel 10 ton roller, one 50 ton self propelled pneumatic, and one blade to compact crushed limestone with four different clay contents varying from 10% to 15%. They were having considerable trouble getting densities with 2" lifts and many passes of the 10 ton pneumatics, the 50 ton pneumatic on the third lift of 6", and a slushing and final rolling with the three wheel roller to slick off.

Three Essick VR-54 (54") Vibrating Compactors in triplex hook-up made two passes on the full six inch lift, with one more fast pass after a water slush to slick off. They got the required density of 140 pounds to the cubic foot, and increased material laid to twice the amount laid before. The three 54" Vibrating Compactors in triplex replaced $67,200 worth of other equipment—reduced operating costs—and doubled the rate of production.

ESSICK VIBRATING COMPACTORS

In any compaction requirement, ESSICK High-Frequency Vibrating Compactors will cut costs, increase production with higher lifts, fewer passes, higher densities, at a greater profit. ESSICK Vibrating Compactors are constantly increasing the profit of thousands of contractors like Fred Hall & Sons and can do the same for you.

9 models of Vibrating Compactors from 13" to 72" widths

for compacting all types of fills, sub base, base materials, asphalt and trenches

Also 14 Models of Tandem Rollers from ½ to 14 Tons.

SEE YOUR ESSICK DEALER FOR A DEMONSTRATION ON YOUR JOB

ESSICK MANUFACTURING COMPANY

1950 Santa Fe Avenue, Los Angeles 21, California

850 Woodruff Lane, Elizabeth, New Jersey

Affiliated with THE T. L. SMITH CO., Milwaukee, Wisconsin

. . . for more details circle 302 on enclosed return postal card

These bins can be tipped over backward out of their wall openings, covered with plywood, and stored on a trailer between jobs.

Field Parts Bins Ready for Quick Move

The two panels of parts and supply bins pictured here were set up by A. Teichert & Son, Inc., contractor, of this company's Interstate 80 (US 40 relocation) project in Central California last year. They occupy openings cut in the front wall of a demountable plywood field commissary building. The door (man entering) fronts on a concrete floor used for light repair work, and over the floor is a roof which provides shelter against the hot mid-California sun and once-in-a-while showers.

The whole building is of no particular interest, perhaps, except for one feature. The two bin assemblies (the framing above bench level) can be taken out of the wall, covered over quickly with plywood panels (seen alongside), tilted back and loaded on a trailer. The parts simply slide back against the rear wall of their bin cubicles—ready for use when the bins are brought upright again.

This picture was taken in the 1959 autumn *before* Teichert wound up the job. The nailed-over bins, as this is written in April of 1960, are stored face-up on trailers ready for toting to a new setup.

Job Safety

Corps Reports 30 Percent Drop in Fatalities

The Corps of Engineers chalked up a 30 percent reduction in the number of fatalities on its work during 1959. This and other statistics on the corps' safety program were contained in the annual safety report issued to all installations and personnel by Robert L. Jenkins, chief of the safety division.

Some of the other tabulations in the report were not as favorable. After noting a decrease of 48 percent in damage to Corps of Engineers property, the following summations are listed:

Increase of 153 percent in contractor property damage; increase of 30 percent in Corps of Engineers employee injuries; increase of 17 percent in contractor employee injuries; increase of 14 percent in total costs of accidents.

The corps incurred 2,314 accidents during 1959, with 782 of these under government operation and 1,532 under contract.

Construction Work Still is Hazardous

The construction industry again has won the dubious distinction of being one of the most hazardous of industries, judging from the reported accident frequency and severity rates.

This is the conclusion gained from the statistics released by the National Safety Council. These facts which are contained in the Council's '59 edition of "Accident Facts" show the following:

1. Construction is 41st among 44 industries reporting, in safety ranking. The frequency rate for the 1958 calendar year was 16.99 (representing however 14 percent reduction from the previous year). This compares with 6.17, the median for all industries reporting.

2. In the severity rate, the construction industry also ranked near the bottom—40th among the 44 industries, with 1,428 rating, down 3 percent (compared with 744, industry median).

ESSICK

VIBRATING COMPACTORS

ESSICK VR 72 ON FREEWAY INTERCHANGE

BACKFILL COMPACTION COSTS CUT IN HALF

"On part of this job involving a tremendous backfilling project of more than a dozen bridges, I would estimate," says Jack Yount, "that by using the VR-72 we doubled our production and cut our compaction costs by at least one-half."

TOUGH FILL EASILY REACHES DENSITY IN 1 TO 3 PASSES

Jack Yount, Vice-president and General Manager of Vinnell Constructors states: "We really had a problem when we started compaction operations on the interchange of the new Golden State and San Bernardino freeways. The fill soil was composed of oil shale, a lightweight, light colored shale and black organic material, and in addition, moisture content was 10-15% over optimum. After many passes and long hours of rework, a Sheepsfoot roller reached density requirements calling for 90% on a modified AASHO test.

"We had successfully used our company-owned Essick VR-54-T compactors in the past, but for this particular fill we chose their larger model VR-72-T. Used in conjunction with the Sheepsfoot Roller (to break up the clods), the Essick 72" vibrator brought the solid density to well above California State Requirements in from 1 to 3 passes.

There is an Essick Vibrating Compactor especially designed to solve your particular compaction problems. The contractor who must achieve higher densities, meet rigid compaction costs and still make every equipment dollar count, relies on ESSICK.

9 models of Vibrating Compactors from 13" to 72" widths

for compacting all types of fills, sub base, base materials, asphalt, and trenches

ALSO 14 MODELS OF TANDEM ROLLERS FROM 1/2 TO 14 TONS

ESSICK MANUFACTURING COMPANY

1950 Santa Fe Avenue
Los Angeles 21, California

850 Woodruff Lane
Elizabeth, New Jersey

Affiliated with THE T. L. SMITH CO., Milwaukee, Wisconsin

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NEW CAT DW20-482 TEAM

HAULS BIG LOADS FAST, INCREASES PRODUCTION

Six-minute cycles on nearly a two-mile round trip hauling 24 bank cu. yd. of slow-loading sand! This is the production from two big Cat DW20G Tractors with new 482 Scrapers speeding road construction on State Highway No. 99 in Marshall County, Oklahoma. The big rigs are owned by the W. D. Jeffrey Construction Company of Fort Smith, Arkansas, contractors on this job.

"The new DW20 and 482 Scraper have a faster cycle and loading time which means higher production," comments Superintendent "Smoky" Branson. He adds, "Down time on equipment is minimum."

The DW20's 345 HP results in 12% increase in rimpull over the former model. This provides up to 20% faster travel speeds under similar haul road conditions. The 482 Scraper is teamed with the DW20 for high production with its 24 cu. yd. struck load capacity (34 cu. yd. heaped). On this job the DW20-482 combination loaded in .93 minute.

Field reports from contractors all over the country confirm the productive efficiency of the big DW20-482 combination. Get the facts from your Caterpillar Dealer. He can prove—right on your job—that economical, high production is built into the new DW20 and 482.

Caterpillar Tractor Co., General Offices, Peoria, Ill., U.S.A.

CATERPILLAR

Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

PICK THE DW20-482 TO BREAK PRODUCTION RECORDS

. . . for more details circle 294 on enclosed return postal card

Updating a Famous Slogan

Slogans alone won't put over the need for a strong highway program. But a good central idea or two might help.

With this thought in mind this page, last September, invited fresh suggestions from readers. Among the letters that came in, one from A. O. Nelson, P.E., of Minneapolis, Minnesota, offered a paraphrase of the famous slogan, "We pay for good roads whether we have them or not—and we pay *more* if we don't have them."

This statement was often used by the late Thos. H. MacDonald during his long tenure as Commissioner of Public Roads and it was a favorite of Charles M. Babcock, Minnesota's first highway commissioner. Babcock employed it with telling effect back in the early 1920s in campaigning for the state's pioneer trunk system improvement program.

We not, suggests Nelson, brush this slogan off and bring it up to date? Possibly it could read:

"We will pay for the Interstate system of freeways whether we delay its completion or not—and we'll pay more, the longer we delay it; more in high transportation cost and delay, more in retarded progress, more in loss of life and limb."

This statement while more an expression of a core idea than a slogan, does say something important in a nutshell. It isn't copyrighted. It is offered here for any who care to give it a try.

Meanwhile possibly Roads and Streets readers might have other suggestions?

Better Spray Bar Work

Editor's Note: It is ironic that the largest and most widespread single kind of highway and street work is the kind that still sees so much foot dragging in quality control.

We refer to "spray bar work"—surface treatments and seal coatings, such as go on everywhere, every day in season, to keep our highways in good surface condition.

Take distributor equipment, for example. Hundreds of old type distributors are still working that ought to be junked or refitted out. Or take a look at the archaic practices involving distributor use. In some states on street and local work, and sometimes on state highway projects, too, you still see distributors working which do not have dripless or circulating spray bars. You see clogged nozzles and bars that don't hang with the crown configuration. You see operators who don't seem to care, or even know exactly what they are doing or how much material to apply, except to do "what seems best."

You see, also, contractors whose profit motive needs to be reoriented into the enlightened state that presently pervades the more progressive of the hot-mix contractors. Perhaps the "sprayers" also need to band together in a national association, with a program to upgrade their quality?

Actually good oiling, sealing and treatment procedures must come about primarily because the public official or engineer is determined to maintain better control over the quality. More even application of the right grade of material, at the right temperature, and with the right cover stone, makes a type of surface renovation that continues to be an excellent "money's worth." Some states, counties and cities are maintaining good control over seals and treatments. It's a shame elsewhere to see a lot of this work still poorly done, when the know-how and the equipment are available to do this work right.

Harold J. McKeever

Base Aggregate Plant Designed for Quick Moves

"Here today and gone tomorrow" is the log book reading of a screening and crushing plant developed by A. Teichert & Son, Inc., of Sacramento, for mineral aggregate base material. Designed for this California contractor's complex of job requirements, the plant is also capable of maintaining a good production clip—sometimes 300 to 400 tons per hour or more—and of being adapted to a variety of specification materials.

Shown here is the plant in action along the company's 12-mile, $7 million contract for a segment of I-80 (US 40 relocation) east of Sacramento. While the plant has seen as many as four or five moves per season, it stayed the better part of a year on this project. Beginning late in 1958 and with inter-

A sweep of the screening and secondary crushing plant, showing the twin systems supplied by the telescoping delivery belt. Note switch house in trailer at left; dozer take-away in rear for slotting into a belt loader beyond.

mittent runs through the 1958-59 winter, it reached its stride in midsummer of 1959 and wound up in autumn. Its production was geared to maintaining sufficient stockpiled material to meet overall project job requirements.

This 4-lane-divided highway segment required 177,500 tons of specification mineral aggregate for a 6-in. untreated base layer and for build-up of the 10-ft. outer and 5-ft. inner shoulder. Another 66,500 tons of the same material was required for a 4-in. cement treated subgrade immediately under the concrete pavement. A small additional tonnage of aggregate for cement treated base at special locations brought the plant's total run to around 250,000 tons.

Before describing the plant, it should be noted that the California Division of Highways' specification for such aggregate is a fairly open one: 100 percent pass 2-in. sieve, 90-100 percent pass 1½-in., 50-90 percent pass ¾-in., 25-50 percent No. 4, and 3-9 percent the No. 200. Quality requirements: 55 percent maximum loss in wet shot rattler; 55 percent loss in Los Angeles rattler (55 rev.); 78 minimum resistance value (Stabilometer); and 30 minimum sand equivalent test.

Suitable material was found in an upland pit two miles from the main plant, the widely varying deposit consisting of "glacial till and some of everything."

Material processing took place in the following

Crushing plant output from the twin belts was dozed up the stockpile and into the feeder using a pair of International TD24s.

portable components of the plant pictured.

1. Equipment at the pit included a Pioneer jaw crusher for reduction to 4 in., and a washing cylinder and a Wemco sand classifier screw to eliminate excess fines. Material was mined by dozers and scrapers. Haul was via a private haul road, under subcontract by Lindeman Bros. of Stockton, this firm using bottom-dumps in tandem.

2. Material on arrival at the screening and reduction plant alongside the job, was dumped into an accentric feeder fabricated by the contractor. It moved via the feeder belt to a second 30′ x 109′ belt and into a twin reduction plant.

Material in the feeder was occasionally hosed to facilitate free passage (the aggregate flowed best when the material was either fairly dry or definitely wet). A vibrator also came into play at times to prevent caking in the flow.

3. The 109 ft. belt (see photo) was another example of Teichert staff handiwork. It was hinged at midpoint for folding during transport.

4. At the top of the delivery belt the material was split by two chutes into symmetrical twin systems. Each began with an El Jay 5′ x 14′ double-deck vibrating screen which dropped 1½-in. minus material directly on a 24-in. belt to stockpile. The screens and chutes were mounted on a specially-built trailer frame, designed with dual tires and tandem axles for over-the-road moves. During production the chassis was carried on Binkley jacks.

5. Scalped material flowed by 24-in. belt on either side of the system to a Symons 4¼-ft. cone crusher, and thence via return belt to the screens for recirculation. The crusher units, too, were made for portability, each being mounted on a Ko-Kal trailer chassis. One of the cones can be converted into a "short head" for producing ¾-in. material.

6. The stockpile belts were each mounted on a tubular steel frame. A feature of the over-all material was the strategy of keeping the material dozed away from the belts and into a large stockpile, for feeding in turn into a loading belt built into the far side.

7. All plant components were electrically operated via enclosed gear motors—no exposed chains or belts—as a means of positive, trouble-free operation. Utility power came in through a General Electric fuseless switch panel, enclosed in a dust-proof cabinet and located inside a weather-proof trailer van.

8. Coming back to the material flow, aggregate

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At AGC's San Francisco Convention

Contractors Told Need to Support Highway Educational Job

Roads and Streets Staff Report

How highway contractors should support the new highway educational program was a chief topic at AGC's highway session at San Francisco. The record turn-out of delegates at the Associated General Contractors of America's 41st annual convention included many of the nation's leading highway builders, and they were present in force at the all-morning road session.

"The highway program is in trouble unless we all help support Congress to do something about its financing in 1961," were the words of Nello L. Teer, North Carolina contractor. Speaking as a past-president of AGC's Carolinas Branch and an organizer of the newly formed Better Highway Information Foundation, he told how this body has emerged as a broadly set up one with many backers rather than representing any one sponsoring organization. Several large money contributions have already been subscribed by individual contractors and state associations, said Teer. The Associated Pennsylvania Constructors, an ARBA chapter, subscribed $60,000 at its recent Atlantic City convention. Nationwide, a fund of $350,000 is sought for the first year.

While the new organization is expected to be permanent, and has a long-range job to do, it also has an immediate emergency task, reminded Teer. That is to turn public apathy to constructive action by the time Congress meets next year, so that congressional leaders will know that the people back home really want the highway program carried out on schedule.

Teer reviewed the road program's present status, explaining again to all who might need a refresher just why the federal financing is still hobbling along. His concern is that there are men in Washington who still feel that the road work should be cut back, despite the fact that traffic volumes are growing rapidly.

"The critics are well intended but misguided," said Teer, "the danger is that neither the economic benefits of roads nor the consequences of letting the program lag is well understood by the ordinary citizen. Actually the program is not big enough. Not only must we build on a large scale but also to a sufficiently high design standard."

The "I" system is designed for 1975 traffic volumes, reminded Teer, and, Washington criticism or no, we cannot afford to build to any lesser standard.

The contractors present were urged to support grass-roots campaigns in their home states. Not only money but ideas are wanted. The average citizen still has only a sketchy idea of what is meant by the Interstate system. The system aspects particularly are hard to grasp, yet the cost-benefit ratio makes the highway program one of the most attractive and profitable types of public works undertakings the nation has ever conceived.

The misconceptions are not confined to ordinary citizens, Teer went on. Such distorted criticism as that published in a recent *Wall Street Journal* editorial (magnifying the reference to alleged graft,

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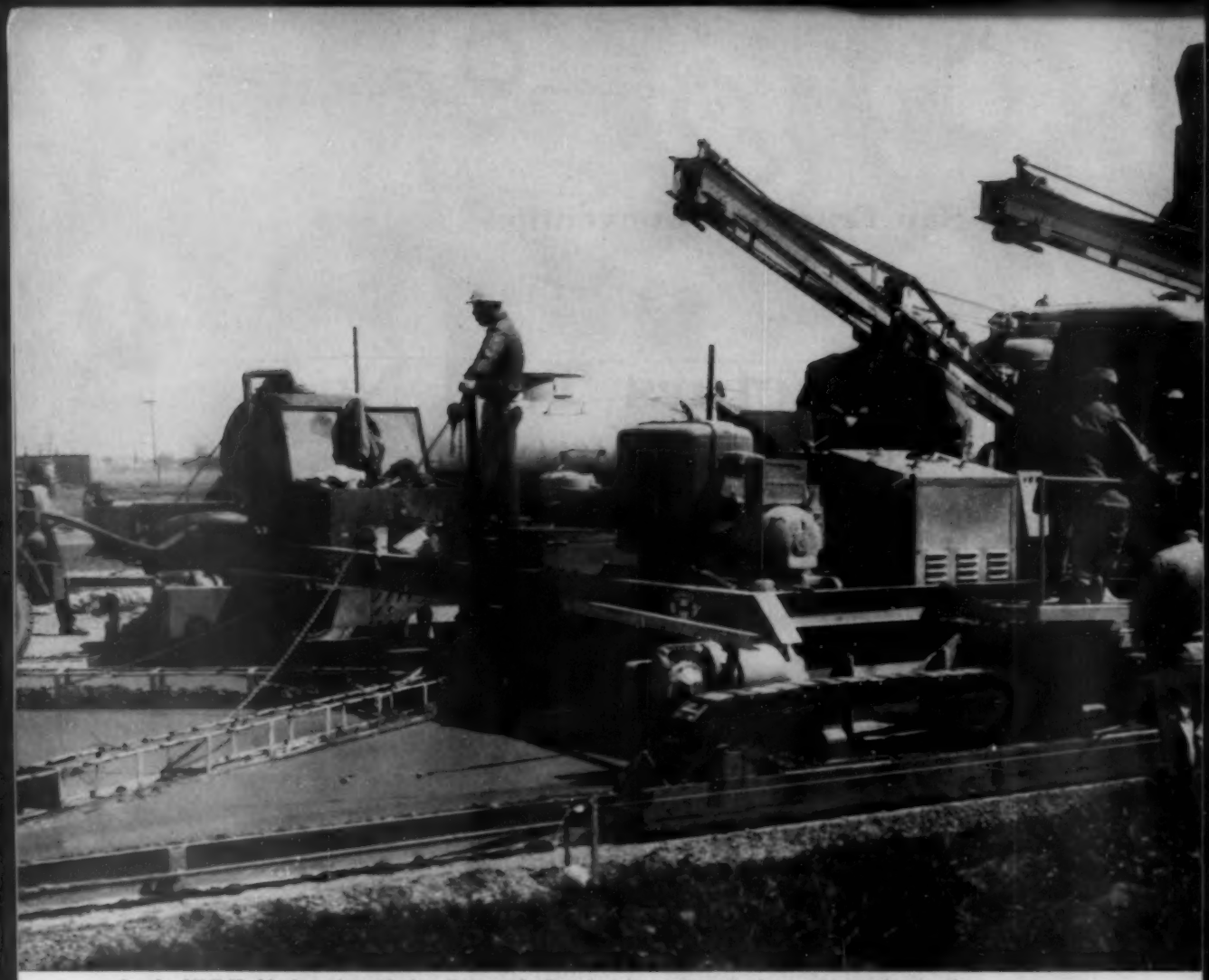


On the UPK-Haddock project, Harbor Freeway in Los Angeles—a Rex slip-form paver and pair of Rex dual-drum paving mixers with standard brooms and brushes are placing 8 in. by 24 ft. slab at better than 2,000 cubic yards daily.

California: Slip-Form Paver Hailed As Major Advance

A new phrase, "slip-form paving," is being bandied about in California highway building circles. Several of the state's veteran paving contractors have cut their eye-teeth in the use of formless pavers. And the California Division of Highways has given the method its blessing.

The Division's widely-circulated staff magazine, "California Highways and Public Works," in a recent issue hailed slip-form paving as a "major advance in construction practice," and devoted a lengthy pictorial report to three contract jobs which the state chose in 1959 for an initial tryout of the new method.

Freshly formed slab on a California freeway job, as seen immediately behind the slip-form machine. Two makes of slip-form pavers have shown excellent evenness control, speed and economy on this state's freeway work. →

The slip-form paver has been the object of development work by various inventors and equipment makers for a good many years. In Iowa and certain other states machines were tried with varying success; this experimental use was chiefly on secondary roads, where a possible lack of surface evenness—if such were to be the result—would not be of such great concern. More recently, Colorado has led the nation's highway departments in the use of the pavers, now better perfected. About 50 miles of Colorado roads have been paved with a slip-form machine. Excellent quality control as well as job economy is reported. (See Roads and Streets, August, 1958.)

Looking along the crawler treads of the Rex slip-form paver. Note evenly finished cement-treated subgrade ahead, which has been swept to make path for the forward leveling wheel.

Another view of Haddock Ltd's slip-form machine, showing the relatively stiff (1-1½-in.-slump) air-entrained concrete used.

Right now two well-perfected machines are in the running. One is made by Chain Belt Company, of Milwaukee, and one by Guntert & Zimmerman, of Stockton, California. While different in some major respects, both machines utilize the same basic principle of trailing side forms. Both receive concrete from one or more paving mixers. Both extrude concrete fully formed as the machine progresses, eliminating the need for any further finishing except hand floating and edging. Both move along on crawlers at about 7 to 10 ft. per minute.

And—both units offer cost saving by eliminating forms, form crews and the traditional finishing train. One traveling machine plus the curing application does it. Saving of as much as one to two dollars per cubic yard in the cost of paving concrete is hoped for in California, once contractors get more familiar with the method.

The kick-off in California came early last year when representatives of the Griffith Company, contractors of Los Angeles, proposed a demonstration of the machine developed by Guntert & Zimmerman. The company built a trial section in the Los Angeles River paved invert contract held with the Corps of Engineers. This work was done under simulated highway conditions, with the Division of Highways on hand for a critical evaluation and review of results of the 24-ft. pours.

As a result the state authorized slip-form paving on an experimental basis in three contracts awarded in 1959, change orders being issued at the contractors' request.

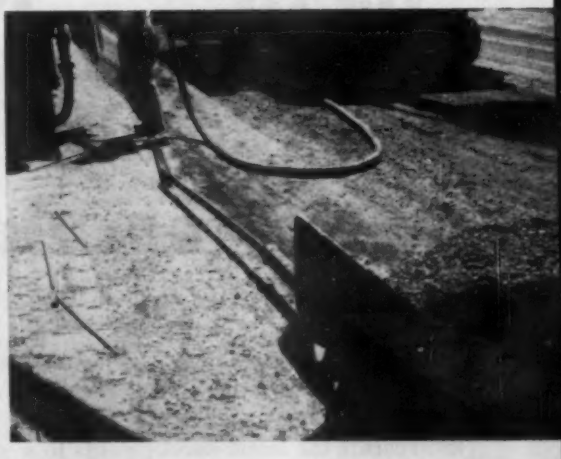
One pair of adjoining jobs was taken by Gordon H. Ball and Gordon H. Ball, Inc., of Danville, Calif. totaling 20 miles of concrete paving 24 ft. wide near Woodland, and involving 65,000 cu. yd. of paving concrete.

The other such contract was awarded to the Griffith Company for freeway paving north of Fresno, totaling 15.5 miles of 24-ft. paving, or 47,400 cu. yd. of concrete. The foregoing jobs utilized Guntert & Zimmerman machines.

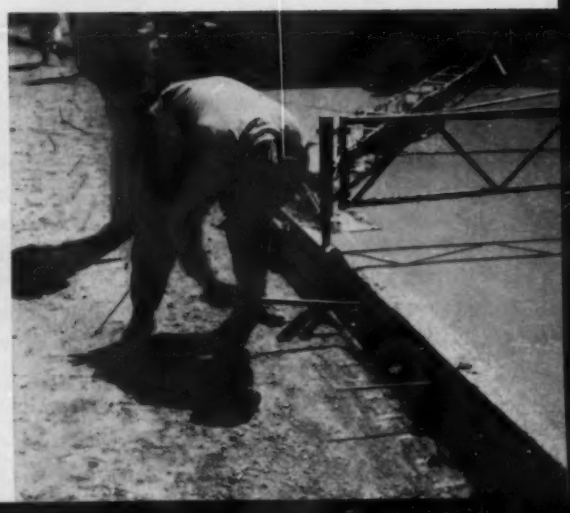
More recently, following completion of these jobs, the joint venture of Gordon H. Ball and Ball & Simpson took another pair of contiguous

Continued on page 132

Maginnis vibrators on Haddock's machine. Worker with inserting frame is ramming centerline tiebars into the concrete at prescribed intervals.



On the Rex machine, metal keyway strips are threaded through a slot and automatically positioned inside the slip-form rail as the machine advances.



Tiebars on outer edge of slab (for four-lane construction) being inserted manually using a hollow forcing tool. Note freshly formed slab edge, as seen before hand finishers took over.

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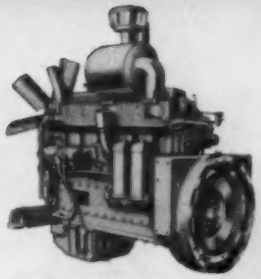
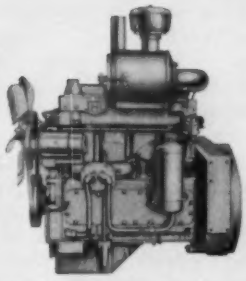


New No. 112E Motor Grader features new compact 85 HP Engine

The new No. 112F is similar in appearance, but features a Turbocharged 100 HP Engine.



NEW HIGH TORQUE. Though the engines in the new Cat Motor Graders are designed specifically for each machine, they all develop higher torque than previous models and have other basic improvements in common. For example: shorter, stiffer blocks and crankshafts... stronger, distortion-resistant cylinder heads... improved cooling systems with greater capacity... engine lubricating oil conditioning... and advanced design fuel systems —new, compact fuel injection pumps with barrel and plunger assemblies in easy-to-service pump housings.

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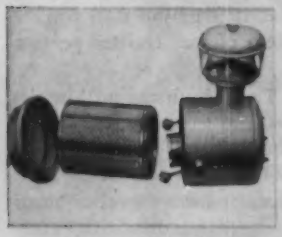
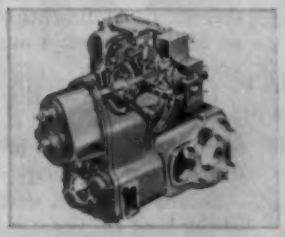
PERFORMANCE-PROVED FEATURES. While many advances have been designed into the compact new engines, certain time-tested features have been retained. To mention a few: precombustion chamber design that delivers maximum horsepower on heavy, economy-type fuels... steel-back aluminum bearings... wet-type "Hi-Electro" hardened cylinder liners... and aluminum pistons with cast-in ring band.

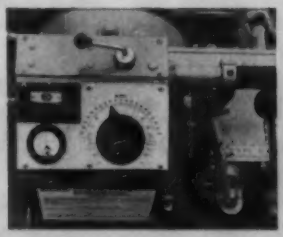
OTHER HIGH-PRODUCTION FEATURES IN CAT MOTOR GRADERS



NEW DRY-TYPE AIR CLEANER (standard) removes a minimum of 99.8% of all dirt from intake air during every service hour. Can be serviced in 5 minutes. Cuts your maintenance time by as much as 70% and substantially reduces maintenance costs. Cleaner air also extends engine life.



EXCLUSIVE OIL CLUTCH (standard) provides up to 2000 hours service without adjustment, the equivalent of about 12 months of "adjustment-free" operation. A Caterpillar development proved by millions of hours of use, it virtually eliminates down time for clutch repair.



AUTOMATIC BLADE CONTROL (optional) cuts grading time in half. Operator sets desired slope on dial and only has to control depth of cut. Manufactured by Preco Incorporated, the unit automatically maintains blade slope within ⅛" in 10'. Available factory installed.

IN-SEAT STARTING (standard) offers operator finger-tip convenience and positive starts in any weather. Another feature: improved mechanical blade controls provide precise adjustment and ease of engagement. "Anti-creep" lock makes blade stay put under load.

What Contractors Want in Earthmoving Equipment

By James R. Cummings
Associate Editor

The contractors had a chance to tell the manufacturers what they thought was needed in earthmoving equipment in the coming years. And at the end of a three-hour session these were the points most discussed:

Safety in operation.

More unitized construction of components.

More manufacturer help in preventive maintenance.

Holding the line on capital costs.

Less "field testing" of equipment by the contractor.

The event was a contractors' panel discussion, a feature of the 11th annual Earthmoving Industry Conference, April 5 and 6 at Peoria, Illinois. The meeting was under the sponsorship of the central Illinois section of the Society of Automotive Engineers.

The panel was studded with contractor brass. Members were C. F. Replogle, president of C. F. Replogle Co., Circleville, Ohio; M. A. Robinson, director of procurement of Morrison-Knudsen Co., Inc., Boise, Idaho; L. P. Gilvin, president of Gilvin-Terril, Inc., Amarillo, Texas; and G. G. Werner, Jr., vice president of Merritt-Chapman & Scott Corp., New York City.

Replogle ticked off his "things desired" under the heading of the most important needs of the contractor today in earthmoving.

Dependability—It is vital to have operating effiency in equipment so that the contractor can have a consistent base on which to estimate and figure costs. He should be able to feel reasonably sure, for example, that a particular scraper will be able to deliver so many hours of performance.

Safety—To illustrate what he considered a serious situation in this regard, Replogle pointed to the danger in transmission failures and related an incident in which "a transmission went out" on a scraper and two casualties, including one death, resulted. "This is serious to us who are out on the jobs."

Availability—If a key piece of equipment fails and drops out of a spread whether for two hours or two days, production will slow, or stop. But costs and overhead of the organization continue.

Preventive Maintenance—"Machines today are so complicated that sledgehammer mechanics can't understand them." What is needed, according to Replogle, is the help of manufacturers in setting up schools for training of those who must make repairs in the shop. "We need help. For example, mechanics don't like paper work; they overlook it, almost to the point of insubordination. The manufacturers could help us educate them."

Sale of machines which "aren't fully tested."—Replogle said that most contractors will cooperate with equipment makers in the field to help build better machines. "But the contractor does not want to do that part of the field testing which the manufacturer should have done. We will cooperate if approached in the right way, but we don't want to be made guinea pigs."

Unitized design—There is a need for more speed in handling repairs. "Why not engines which can be disconnected from fuel and air lines in minutes and then just lifted out?"

Looking into his crystal ball, M-K's Robinson saw more efficient hydraulics, also a necessary increase in unitized components—"it costs less to be able to drop in a repaired component."

He said the general efficiency of equipment will be increased, but probably at the cost of greater complexity.

Robinson said there is a need for more use of steels of higher tensile strength and greater abrasion resistance. He, too, stressed preventive maintenance and said that manufacturers should not only have specially trained personnel to help on contractors' field problems but should also consider development of repair depots for component parts.

He said that M-K started a mechanics' training school five years ago, a 7-week course with classes 5½ days and 3 nights a week. The school is expensive, but it enables personnel to stay abreast of current developments and is a major step toward an M-K objective: a nucleus of well-trained personnel on each job.

L. P. Gilvin said that Texas highway authorities are beginning to look closely at excessive weights on the state's roads, and he hopes for a better means of dismantling heavy equipment.

Gilvin remarked that, since the general contour of the land in Texas minimizes earthmoving—compared to other areas—he would like to see a smaller unit rated to move from 75 to 100 cu. yd of dirt per hour on short hauls. "Everybody looks for the big-quantity jobs, but it's the other that we see most and it's on these small jobs where the costs can go sky-high."

Continued on page 87

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TURN PAGE

ESTIMATING EARTHMOVING COSTS

There are several different ways of estimating earthmoving production. There is the wild guess (this has bankrupted many), the educated guess (this depends entirely on the experience of the guesser), and the arithmetical calculation tempered with good judgment.

The latter is the most reliable means of job estimating. It consists of analyzing each segment of the job and arriving at a total required time per unit to move the total yardage.

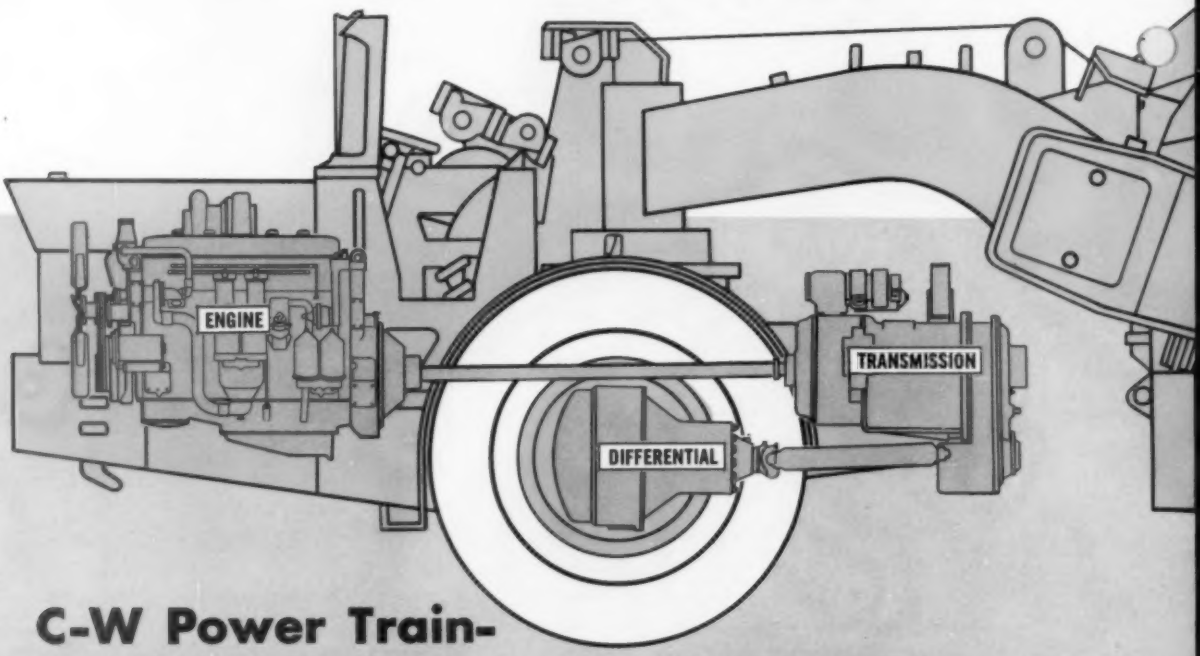
For example: A job has 3,000,000 cu. yds. of excavation. A particular cut contains 236,000 yds. that can go into one fill with an average haul of 3500 ft. The material is sandy clay with good loading characteristics and a bank weight of 2800# per yard. The contractor owns four available CW-226's. The haul will be over the new road bed, compacted, well maintained, with a 3% favorable grade, loaded, and an estimated rolling resistance of 70# per ton. In this type of material, the CW-226 averages a 1.12 bowl factor. Cycle time is figured as follows:

Weight empty	= 85,500#	=	42.75 tons
Load 26 x 1.12 x 2800	= 81,536#	=	40.75 tons
Gross Weight	= 167,036#	=	83.5 tons
Rolling Resistance Empty	= 70#/ton x 42.75 tons	=	2,933#
Grade Resistance Empty	= 20 x 3% x 42.75 tons	=	+2,565#
			5,558#
Rolling Resistance loaded	= 70#/ton x 83.5 tons	=	5,845#
Grade *Assistance* loaded	= 20 x 3 x 83.5 tons	=	−5,010#
			835#

Spot in cut and wait for pusher	.5 min.
Load	.8 min.
Accelerate	.3 min.
Travel 3500′ 4th gear 30 mph $\frac{3500}{30 \times 88}$	1.3 min.
Dump and turn	.5 min.
Accelerate	.3 min.
Return 3500′ 3rd gear 16 mph $\frac{3500}{16 \times 88}$	2.5 min.
	6.2 min.

Based on a 50 minute hour (83% efficiency) each unit will make 8 trips per hour $\frac{(60)}{(6.2)}$, hauling 26 x 1.12 or 29.1 pay yards each trip. Hourly production is then 233 pay yards. The CW-226 has an estimated hourly ownership and operating cost of $25.30 per hour. Cost per yard would be $\frac{25.30}{233}$ or 10.8¢ per yard. With four units being used, each should bear ¼ of the cost of the pushers, grader and water truck. Based on a 10 hour shift, the four units would produce 9320 cu. yds. per shift and would work the cut in 25.4 shifts.

Going back to the calculation of cycle time, it should be explained that we are figuring on a tightly-run job with top operators on all units. If such is not the case, the use of two push-tractors should be considered. Loading time is based on the size of the hauling units, size of the push-tractor and loading characteristics of the material. The acceleration figure is a case of mathematics and judgment. Rimpull charts for the CW-226 show 4140# in 3rd gear lockup and 2780# in 4th gear lockup. Previous calculations showed that due to grade assistance only 835# is required to move the load. Therefore, there is excess rimpull equal to 39# per gross ton in 3rd gear lockup and 23# per gross ton in 4th gear lockup. This is a very favorable excess and will result in rapid acceleration. One mph equals 88 ft. per minute, therefore, the travel time formula is $\frac{\text{DISTANCE IN FT.}}{\text{SPEED IN MPH} \times 88}$ with the answer in minutes. Dump and turn time is determined by job conditions. This material will dump quickly and spread evenly for a solid haul road. The acceleration on return is based on the fact that although the unit is empty it has a grade resistance of 2535# in addition to the rolling resistance and therefore will at best be travelling in 3rd gear, convertor stage. Return travel time is figured in the same manner as travel time, loaded. Basing your calculations on the standard 50 minute hour, you should arrive at an accurate estimate of job time and costs.



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SAE EARTHMOVING CONFERENCE

Continued from page 84

Developments of the decade ahead as seen by Werner of Merritt-Chapman & Scott: simplification of controls, reduction in number of moving parts, rising labor costs, more powerful equipment. He also sees application of nuclear propulsion in about ten years, adding that a jet propelled engine with high horsepower seems adaptable to all-wheel-drive, high capacity equipment, but that the problem will be to get this high horsepower into the wheel drive.

Werner expressed concern over equipment costs. While manufacturers are moving toward increased efficiency and capacity, they are also increasing the contractor's capital costs. One of the "musts" of being a contractor today is the proven ability to borrow money, and this strains everybody, including the big contractors, Werner said.

He spoke with some emphasis on the necessity of the manufacturer stating the limitations of his equipment. As an illustration, he said that many bottom-dump wagons are used in such a way as to exceed the strength of their construction. A wagon which can be loaded under a belt loader or by a shovel with up to a 4-yd. bucket will be put to undue stress under buckets of 6 to 8 yd. or larger, or in handling material of too high a specific gravity. Off-road hauling units today generally do not have enough structural metal, "yet you see them being delivered to the contractor with factory-built sideboards."

Werner also trod heavily on the topic of rubber tires for earthmoving equipment. These machines, he said, have from 10 to 50 thousand dollars worth of rubber in contact with the ground at all times; thus this is a matter of extreme importance to the contractor.

"We need a really puncture-proof and blowout-proof tire for heavy work, especially rock work. In the last two years, on projects under my supervision alone, we used up, consumed, over 1 million dollars worth of tires."

Questions Popped at the SAE Earthmoving Equipment Panel

Question: Do you contractors want, or do you not want, automatic transmissions on earthmoving equipment in the future?

Replogle: Yes, we want a trouble-free automatic transmission. The automatic type gives greater efficiency in its constant direct power to the ground.

Robinson (Morrison-Knudsen): We want the automatic type, too. The less work and thinking for operators, the better.

Question: Do you see an increase in the use of self-propelled scrapers in shale and rock instead of shovels and trucks?

Robinson: Yes, but we need better tires. We consider scrapers the most economical tool for moving this material, except in big shot work.

Replogle: Scrapers should be designed for rock work. Depending on the type of rock, a scraper spread will be more productive here than a shovel spread, but a scraper must be designed for this work.

Question: Is the contractor willing to pay for the greatly increased cost of manufacturing these more versatile machines?

Werner (Merrit-Chapman & Scott): Yes, we will pay increased capital cost with the expectation of performance coming up to the price.

Question: On two-shift work, is night dirt production as good as day, and if not, why not?

Werner: Yes it is as good. Most rock is shot in the daytime, so we get better hauling production at night.

Replogle: On highway work we also have found night work better. Daylight involves clean-up and maintenance work whereas at night we just haul dirt. We even do better on bridge work at night; less distraction probably—there aren't as many pretty girls to be seen.

Question: What are your practices and opinions of sideboarding?

Replogle: I object to the term 'sideboard'—it's 'profitboard'. You see pictures of dirt being wasted over the side in order to fill the apron; 'profitboards' would have helped this.

Robinson: True, but this means you have to lift the dirt higher.

Replogle: Yes, I was speaking partly in jest. Certainly we feel that heaping the scraper is not always the proper objective, especially on heavy dirt.

Question: There has been no comment on brakes thus far. Do you feel they are adequate?

Replogle: No. There is development work to be done. When you see a scraper coming down off a hill dragging the apron, you can see that better brakes are needed. In rock work, this is especially so.

Werner: It is essential that all large, off-road rock hauling equipment have retarders, otherwise the machines have to turn up excessive engine speed or will have to ride the brakes.

Question: Do you prefer to do your own overhaul work on components?

Werner: It depends on where our job is located, how far we would have to send the unit back; it also depends on the size and type involved. When possible we prefer to ship back to the manufacturer and swap components. Another factor: we in the field would not have the expert mechanics available in the maker's shops.

Question: Since maintenance is such a big item of expense, what will happen if equipment gets to be trouble-free; what variables will there be in bidding to bring out a low bid?

Werner: There are a lot of factors in bidding other than equipment. Most important of all is the human element: how good or bad an estimating job is done.

Gilvin: The main expenses to us are labor and cost of ownership. Maintenance is third.

Noontime on Talbott's I-75 grading job. As servicing is done on each machine, the service man fills out a "PM" report sheet kept in the truck cab.

One of the Curtiss-Wright CW 226 scrapers in a squadron of these units which were tallied systematically for loading time, pay yardage per trip, cycle time, and hours of availability.

Kentucky Contractor Keeps Down-Time Down

Exacting 'PM' and good operators help get high scraper yardage, 90% machine availability, during long season

There's nothing that makes a contractor feel sicker than to see a machine down for repairs in the midst of a job. Weather delays, he must anticipate, but when the dirt is right, the sun shining, and it's haymaking time, it is downright tragic to have a dozer or a scraper sitting idle while the mechanics are sweating over it.

Getting maximum productive hours out of equipment has been a central part of the management philosophy of Talbott Construction Co., of Winchester, Kentucky. This company which was founded right after the War by brothers J. Scott and Morton S. Talbott, John J. Avent and E. L. Tobin, has tackled a succession of earthmoving, railroad and road building jobs.

Today the company is one of the leaders in the Kentucky area. J. Scott Talbott, president, credits the firm's success in selecting good equipment and taking care of it. But equally, he feels that credit is due his organization, which today is made up of superintendents, foremen, operators and mechanics who have joined the firm and stayed with it with remarkably little turnover—literally a veteran team.

An example of a Talbott job and some of the firm's management policies in action can be observed on the company's current work on US 25 relocation south of Covington, Kentucky. Actually the job consists of a pair of contract sections for this leg of Interstate 75.

A four-mile intervening contract separates Talbott's grade-drain-structure segments. No. 1 is 4.15 miles long with 2,100,000 cu. yd. of roadway excavation; No. 2 is 4.5 miles with 1,250,000 cu. yd. The two jobs, awarded at the same time, have lent themselves well to handling under a single management and with a single equipment outfit.

Both jobs entail scraper work principally, with about 500,000 cu. yd. of rock removal in the two sections. The dirt in the rolling terrain consists of "a little of everything"—heavy clay, including gray gumbo type and shale type, and wet sandy material. All in all, it's been an "average hill country job" for a scraper outfit, with little difficulty except for waiting for moisture to dry out at times during the season and more often as winter approached.

The cut-and-fill configuration: project No. 1 has a 318,000 cu. yd. fill (70 ft. maximum depth) and two other fills of 100,000 and 200,000 cu. yd. Project No. 2 has a succession of smaller cuts. The average one-way hauls for the two sections taking in both dirt and rock are 1,460 and 1,600 ft. respectively.

The contractor worked up a special distribution sheet in addition to the usual mass diagram to compute hauls and plan the disposition of cut material. Haul grades during the early part of the work were carefully planned—an important cost and production consideration, in view of the fact that in one place an extreme difference of elevation of ravine

One of Talbott Construction Company's Buffalo-Springfield Kompactors on a wide expanse of fill. Note how the segment shoes keep a relatively flat, pocketless surface for quicker drying out after rains.

Morton Talbott "Motorola-ing" in to the field office from his car out on the job.

In one of the larger rock areas—Northwest 80D loading Euclid rear-dumps.

bottom and hilltop of 100 ft. was involved.

The company did the necessary light clearing in April and May, 1959, received its work order on grading about mid-May after a wet spring. Grading started in earnest about June 1. The scraper equipment brought to the combined jobs consisted of 5 new Curtiss-Wright CW 226 scrapers with GM 6-110T (360 hp) engines; a LeTourneau-Westinghouse Super C Tournapull; and, in the autumn for a short time, 6 Cat DW21 scrapers (18-yd.), and 3 old LaPlante-Choate pans, which came from another job.

Dozers and tractors included 6 International TD24's (some elsewhere part of the season); 2 Euclid TC 12 twin-engine; 3 Cat D9 (pushers only); and 10 D8s.

Rock handling equipment consisted of 2 Northwest 80D 2½-yd. shovels, 3 Euclid 66TD (18-yd.) and 5 Euclid 91FD (13-yd.) rear-dumps, the 66TD's being sideboarded for an additional 4-yd. capacity; 1 Gardner-Denver DH 143 track drill (5½-in.), 2 DH 123 drills (3 and 3½ in.), and 2 900 cfm compressors (Gardner-Denver and Ingersoll-Rand).

Also in the fleet were 4 Cat 12 motor graders and one of the new Cat 14's; 4 Buffalo-Springfield Kompactors, Model K45s; 2 dual sheepsfoot units; 2 Cat Traxcavator 966 loaders; 4 Barco gasoline-driven tampers; 2 Lorain ¾-yd. backhoes and one Lorain ¾-yd. motor crane; grease truck and miscellaneous

The Talbott job as seen in November of 1959 with much of the grading done. The pusher here is a TC12 Euclid twin-engine tractor with blocks fore and aft.

equipment including an all-wheel-drive Jeep, tire truck and pickups (some Motorola radio equipped), and lowbed trailers as needed.

Clearing was done with three D8s carrying Fleco root rakes and with Homelite and Eclipse chain saws.

This equipment built up production gradually on a single shift basis, working five 10-hour and one 8-hour day (Saturday) per week. The firm split up the equipment between the two projects, frequently shuttling units back and forth to keep a balance of scrapers and pushers. When rock was opened up and the shovels began working, daily production often ran to 20,000 to 24,000 cu. yd. or more. The five Curtiss-Wright machines, once the work got into midsummer stride, tallied 12,000 to 13,000 cu. yd. daily in the longer-haul material. The CW 226s were usually deployed three on one job and two on the other, each group having a TC12 for push-loading. The DW21s when they came along later for a few weeks were push-loaded by their companion D9s.

The 226's with 26 cu. yd. bowl capacity, struck measure, were particularly watched for their production pattern. Loads varied from as little as 25 pay yards in blasted and ripped slate to as high as 31 pay yards in sandy loam. The soil in the job varied from 2,800 to 3,000 lb. per bank cubic yard. Somewhat over 100 percent bowl factor was reported for the five scrapers, overall, for the 1959 working season.

The TC12s were equipped with push blocks both fore and aft, for tandem loading, but this practice was not followed extensively.

In the 6½ months from June 1 to December 15, 1959, taking in the slow start and frequent weather stoppages of late fall, the five Curtiss-Wright CW 226s, logged 1,400,000 cu. yd. of the total of 2,850,000 cu. yd. of earth and rock moved in the two projects. Only cleanup yardage remains for the present spring.

Company owners credited this very satisfactory scraper performance to the factors already mentioned (good preventive maintenance and good operators) and also to the machines themselves. Whoever and whatever shares the credit, the fact remained that the five CW 226 scrapers ran through this 28-week season with better than 90 percent "availability factor"—which is another way of saying that the machines performed above par with respect to down-time during hours the dirt could be moved.

Compaction has presented no serious problem on this work. The clay and sandy soil, as well as rock and shale materials, have blended well to make high grade embankment under the Kentucky Interstate specification of 95 percent standard AASHO den-

Continued on page 150

The Problem of Bridge Deck Deterioration

Research for new answers, and tighter construction control—both are needed to build decks more durably.

By H. B. Britton

Senior Structural
Specifications Writer

New York State Department of
Public Works

There has been considerable comment, both verbal and printed, regarding the extensive failures of concrete bridge decks of recent construction. In general, the structures referred to are the traffic carriers on express highways.

These failures should point to the fact that we need more research in this field.

Douglas McHenry, past president of the American Concrete Institute, speaking at ACI's 1959 convention in Los Angeles, stated: "Just 20 years ago a strong and effective plea was published in the ACI Journal to 'shorten the lag between research and practice', on the basis that the time lag was too great between the discoveries and findings of research in engineering and their acceptance and application by engineering practitioners.

"In the field of concrete construction, perhaps more than in any other field of engineering," he continued, "we are on the verge of a reversal of that situation. Research is not occupying its time-honored place well ahead of practice, and in some areas it is definitely lagging behind. Examples might be cited by the dozen, but that can be done by each of you in his own field, and need not be recorded here.

"The fault cannot be ascribed to the research workers, and it is difficult even to say that the industry is at fault, for the industry is composed of many segments which encounter difficulty in getting together. We are confronted, rather, by an unsolved problem in methodology. ACI has been working on the problem, though not intensively, for years; the Reinforced Concrete Research Council has made some progress; the American Society of Civil Engineers has recently become acutely aware of it. The answer will come either from government (which is also working on it) or from industry. If from the latter, it will be through the leaders of our industry developing a greater awareness of the problem and then pooling their administrative, intellectual, and financial resources to solve it."

It is a well-known fact that negative results are just as important as positive results in any analytical investigation. It is very disconcerting however when a well designed and constructed bridge performs in such a manner as to indicate a negative result. Since civil engineering projects in general, and bridges in particular, are unique in that the constructed unit is exposed to view, it behooves us to investigate all possible and probable causes for this noticed phenomena.

Since the distress noted in the concrete bridge decks is not confined to structures in any one given locality, it would appear that the results stem from some error in basic fundamentals.

Before we explore the many possibilities, I want it clearly understood that there is no doubt in my mind but that all structures involved have been properly designed in conformance with the (then) current design criteria; that construction was accomplished in accordance with the recognized specifications of the time; that the contractor performed faithfully under this agreement; and that the inspection was performed as required by the agency involved.

If you have read this far, you probably are saying that, if this is so, then *why* the failures?

Continued on page 95

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Anyone who comes on to a construction job, even a man unfamiliar with construction work, can immediately sense any presence of trouble. Idle trucks, silent engines scream of loss.

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Don't take our word for it—ask Northwest owners! Northwests stay on the job! *They are always ready to go. We hear it everywhere, and Northwest owners will tell you so.* The smooth coordination of action between assemblies for machine movements—the Northwest Dual Independent Crowd that utilizes force most other independent crowd shovels waste—the easy, accurate control of the drum clutches through the Feather-Touch Clutch Control, with its true *feel* of the load—the precision in handling and spotting loads made possible by the smooth acting Uniform Pressure Swing Clutches—and the many other Northwest advantages backed by Northwest ruggedness of construction take output beyond mere hourly production.

Here is the versatility, stamina and performance to deliver—not just hour-by-hour but day-by-day and week-by-week—a high *monthly* output. Ability to stay on the job and high output are the reasons why one out of every three Northwests sold is a repeat order.

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An example of bridge deck paving in New York state where modern finishing equipment and specially designed concrete have been used to insure a good quality deck slab.

BRIDGE DECK DETERIORATION

Continued from page 92

If I have gotten you to say "why", it might just possibly be that this will be the word that will act as the key to unlock our minds which we may have closed with our textbooks.

The easily observed and obvious failures in the concrete structural deck and concrete wearing surfaces are, excessive cracking, pop-outs and spalling. But there are other failures not so easily observed and of which the layman is unaware. These are deterioration of structural deck concrete under the wearing course, caused by the intrusion of deleterious substances or disintegration of the concrete by a reaction of some component part in the presence of moisture. The reasons for this could be attributed to any one or a combination of the categories mentioned: Design, Specifications, Construction, Inspection, Materials.

For no apparent reason other than making it easier for myself, I would like to pose some questions categorically. These cover areas which might—through experience gained, or research required—bring enlightenment and ultimately eliminate failures of structural decks and wearing courses.

Design: Structure design based on composite action has been more or less uniformly adopted; experience has borne out design criteria proving the economic benefits.

What investigations involving impact and vibration have been made on this type of structure from high-speed truck traffic? What effect does truck tire design have on this type structure? What investigations have been made on different effects obtained from diesel and gasoline powered equipment?

What research has been made (or could be made) to show that fully composite construction has been obtained? What measures could be taken to give reasonable assurance that the construction conforms with the design?

What investigations have been made or criteria developed on concrete strength desirable for composite decks?

Have design criteria kept up with construction practice?

Specifications: Are material specifications so worded that they will reflect the current requirement? Have investigations and evaluation of new materials been made? Are material sources investigated at regular intervals, and the materials tested in conformance with the current requirements?

Have specifications been updated to take advantage of new construction materials? Ditto for latest construction methods and equipment?

Construction: What contribution has the contractor in general made toward the research and development of equipment—that will enable him to handle his work more efficiently and give the owner a better bridge.

What programs have contractors undertaken to insure the proper training of their personnel in the use of bridge deck equipment and materials?

Has the contractor acquainted himself with the best acceptable construction practices under all kinds of weather conditions?

Inspection: Has a proper table of

organization been established for the inspection agency responsible for the ultimate construction?

Have inspection people been fully posted on modification of design, inclusion of new materials and methods and techniques?

Have training programs been set up for the inspection personnel? Is the right man in the right job?

There are no answers available at this time to many of the questions noted above; however, it can be told what bridge deck techniques are being employed today in hope of getting a better end-result.

Admixtures: Construction can be accomplished in conformance with present design criteria by proper and intelligent use of admixtures having a proven performance record. Purposeful entrainment of air in concrete has contributed greater durability to structural concrete. Retarding densifiers have helped place concrete more in accordance with construction requirements. Air entrainment and a densifier combined can often reduce water-cement ratio by as much as 20 percent, producing a denser concrete mass with attendent increase in compressive strength.

Concrete Quality: It is the writer's opinion that compressive strength of structural deck concrete should be between 3,000 and 3,500 psi. Top cover of the reinforcing rods should be a minimum of 2 in. Vibration of the concrete should be a science, and working of the surface kept to a minimum. The concrete should be cured by quilted covers, kept wet, or by plastic coated burlap blankets consisting of burlap (not less than 9 oz. per sq. yd.), impregnated with a white opaque polyethylene film 4 mils thick in one side.

It is imperative the concrete be protected until it gains its maturity to assure full resistance to weather or de-icing chemicals. This protection is needed over two to three years. Protective materials such as silicones or epoxy resin sealing compounds will greatly enhance the concrete durability.

Where asphaltic overlays are employed consideration should be given to securing a complete waterproofing of the underlying concrete.

It might also be well to employ an epoxy surface treatment to the asphalt overlay, together with grits, so as to produce a waterproof nonskid wearing surface.

Better Administrative Control: Basic to the whole problem is that concrete as a construction material requires constant quality control. All personnel concerned must be made thoroughly aware of the techniques.

Records for all concrete produced should include the location as well as the following information:

1. The mix, indicating the cement, sand and stone in lb. per cu. ft. of concrete, together with quantity and types of admixtures used. Indicate also method of introducing admixtures to the mix.

2. Gradation of aggregates together with temperature and moisture content.

3. Slump, air content, water-cement ratio, and temperature of concrete when placed.

4. Ambient temperature, humidity, weather and other climatic conditions at time of placement.

5. Time of progressive placement.

6. Method of finishing.

7. Time when curing was begun, method of curing, and results obtained.

8. Cast sufficient test cylinders and submit to the Laboratory to permit results at 7, 14 and 28 days. This requires, under one recommended specification, a minimum of nine cylinders for the first 50 cu. yd. or portion thereof, as well as nine cylinders for each additional 100 cu. yd. placed at any one time.

Concrete is the one material produced at the job site under all the varying conditions of design, construction methods, inspection and weather. It is imperative that the producer and inspector cooperate fully in the intelligent formulation, placing and curing of the concrete —in strict conformance with specifications and in recognition of the methods and weather involved.

"Big Tire" Truck

Handling of this rubber giant, which stands 10 ft. high and weighs nearly three tons, becomes a relatively simple task with the new "big tire" truck built by an Akron firm. E. C. Shoman of Goodyear's highway transportation department, demonstrates how one man can operate the equipment which was designed by George Body & Trailer Co.

The tire, world's largest, was produced by Goodyear for largest earth-moving equipment. The new truck is custom-built and mounted on a chassis of the four-wheel drive type. Equipment includes automatic hydraulic loader, air compressor, air tools and servicing equipment.

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3. Adhesive with THIOKOL liquid polymer—made and sold commercially by several processors—is spread on prepared surface with brooms or heavy brushes. Thirty minutes later, while adhesive is still tacky, new concrete is poured.

4. Concrete is laid conventionally. It can also be worked out to a feather-edge without danger of later failure—so tenacious is the adhesive bond of new to old concrete.

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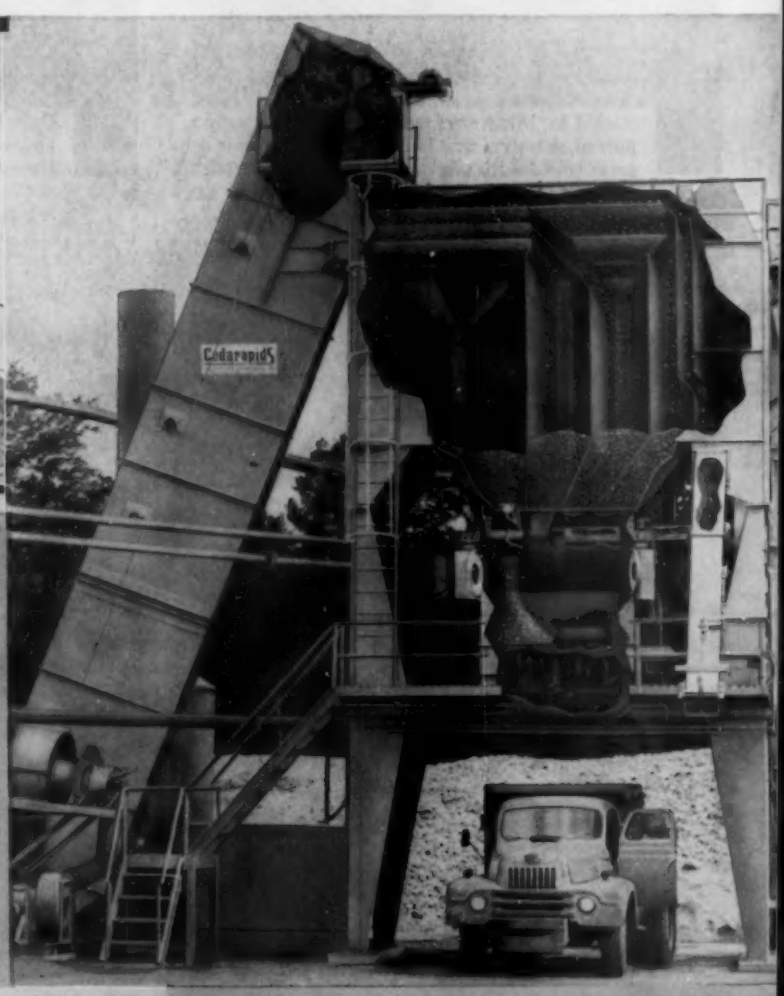

100% portable Model G-Unit Plants have the only truly self-erecting mechanism available to raise "packaged" sections, complete with running gear, into position. Three G-Unit models meet your big-job needs, cut between-job delays.

Cedarapids Portable G-Unit Plants and all five models of H-Unit Stack-Up Plants are packed with profit-benefits that reduce your cost per ton. You'll see some in the cut-away drawing. Ask your Cedarapids Dealer to describe the many others, including the All-Automatic Controls that speed operation to give you two or three extra batches per hour, with no additional maintenance or operating cost.

Model H-Unit stack-up design, with self-contained "packaged" sections that are quickly and easily handled by crane, reduces your initial investment to save money right from the start. Sections can be equipped with running gear if moving becomes frequent. And there's a size to meet every capacity requirement, from 1500-lb. to 7500-lb. batches. Whatever type or size plant you need, you can depend on Cedarapids engineering in every model to cut your cost per ton.

"Low upkeep costs and ease of maintenance, plus the ability to handle large tonnages, make Cedarapids my favorite," says Stuart Adams

Eleven years ago Mr. Stuart Adams started producing asphaltic concrete and crushed stone with Cedarapids equipment. Today this successful and experienced producer still orders and reorders Cedarapids Plants for his Adams Construction Co. and Levisa Stone Co. in Paintsville, Kentucky. His *fourth* Cedarapids Asphalt Plant is a stationary Model H60 which is producing up to 240 tons per hour.

Mr. Adams' statement quoted above also applies to his Cedarapids Bituminous Paver, Stabilized Base Mixer, and his many Cedarapids-equipped aggregate plants in Kentucky.

When *your* market calls for big tonnages of asphaltic concrete produced at low cost per ton, be sure to investigate (and compare) all the profit-benefits Cedarapids engineers into every plant in the complete line. Ask your Cedarapids Dealer about the right size and type of plant for your needs.

Cedarapids engineered for lowest cost per ton

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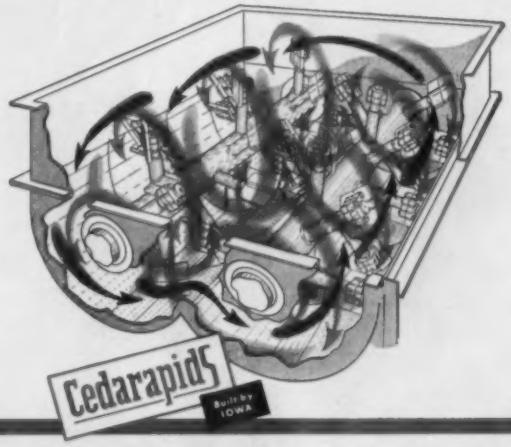
The Cedarapids pugmill mixer is the heart of your plant. Its wide, long body handles larger batches and its design makes a "shallow" batch which requires less power. There is plenty of space above the shafts through which the bitumen and aggregate are carried, while the spiral pattern of the paddles assures fast and efficient mixing. Material is thoroughly stirred and intermixed into a completely coated homogeneous mass. There is no compaction of materials under shafts or paddles.



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When this photograph was taken, 8,000 yards of right-of-way had been cleared of trees, and the roadbed was being prepared for surfacing.

"Sinclair Helped Cut Maintenance Costs On Every Mile of Our Northway Section"

says J. Hanna, Superintendent,
D. A. Collins Construction Company

The Northway, another link in the nation's grid of superhighways, connects the New York State Thruway with the Canadian border. Mr. Hanna says, "Our heavy-duty equipment took the toughest kind of punishment on this project. Work ranged from ripping out trees to building bridges. Yet our maintenance costs were far below what we anticipated. Much of the credit must go to Sinclair's service and their high quality fuels and lubricants. They kept our equipment operating at peak efficiency . . . *on schedule*. These are reasons enough why we use Sinclair Products exclusively."

If you haven't discovered the cost-cutting possibilities of Sinclair services and products, see your local Sinclair Supplier – or write Sinclair Refining Company, Contractor Sales Dept., 600 Fifth Avenue, New York 20, N. Y.

Sinclair

Fuels and Lubricants

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Mr. Hanna reports, "The portable trailer tanks Sinclair loaned to us contributed greatly to the speed and efficiency on our section. We were able to refuel on the job . . . **fast, and keep our equipment working full time.**"

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States Urged to Start 'Do-it-yourself' Movement

Discouraged over lack of Washington responsibility, state engineers at AHONAS meeting call for renewed state leadership

By Duane L. Cronk
Director, Highway Information Services, Washington, D.C.

State highway officials at the meeting of the Association of State Highway Officials of the North Atlantic States heard their president call for a return to state leadership in highway matters.

R. A. Haber, chief engineer of the Delaware state highway department, told his colleagues from the 11 surrounding states that "we must solve some of our highway problems by ourselves without depending so much on the federal government and others."

"The next few years may be 'do-it-yourself' years for the states."

Mr. Haber complained that the general public has become apathetic about the national highway program, that the press is going out of its way to find sensational bad news to print, that contractors too "have been very apathetic" in support of state highway departments during periods of stress, and that the federal government has partially backed away from the huge undertaking.

"Decisions from Washington have been as rare as lilacs in January," he said.

"Some of us are beginning to wonder who really cares whether or not this massive highway program is successful. Certainly it hasn't been the leadership in Washington this past year. If your states received their federal aid in the same manner as did we in Delaware, you know that constructive criticism is definitely in order.

One of the hard lessons of the last year, he concluded, has been that the states must assume more responsibility for solving their own highway problems. This is happening already, he pointed out, in the North Atlantic states where it is apparent that federal aid—even the 90-10 Interstate program—is not enough to meet the traffic build-up. A return to toll financing is one answer.

"Delaware is actively pushing the toll-way theme," he said. "Maryland officials are doing the same."

(Maryland has decided to go ahead and finance construction of a badly needed major route, from Baltimore to the Delaware state line, by tolls. It would be a number of years before federal-aid could be expected for the project.)

State officials have become increasingly frustrated over their lack of voice in recent highway program developments, Governor David Lawrence of Pennsylvania told the convention. He cited contract controls and design changes being forced upon the state highway departments by the Administration in Washington.

"We—the states—have been derelict in not making ourselves heard more effectively," he maintained "And we must be heard or we will soon find ourselves completely submerged by the federal government's role in the vast roadbuilding program."

Another major speaker called for the same kind of aggressiveness in planning. Highway engineers must move into the area of *total* transportation planning in urban areas and assume the leadership here,

John B. Funk, chairman of the Maryland State Roads Commission said. He called for creation of a total transportation department in each state and at the federal level. The U. S. Bureau of Public Roads should become the center for comprehensive transportation planning —not only highway, but rail, bus, monorail, pedestrian, helicopter, and other, he recommended.

The same concentration being applied to highway planning should be applied to all forms of transportation. If it is not, the rapid urbanization of the East Coast will lead to "built-in traffic chaos."

"Highway officials have perhaps the strongest possible organization in the public works and planning field," Mr. Funk asserted, and they are prepared nationally and at the state level to take over the total transportation planning job. Using transportation as a planning tool, to determine future land use, there may be a chance to catch up.

"Then," he concluded, "transportation will not always be in the position of trying to catch up with a snow ball that rolled down the hill 10 minutes ago."

Angelo A. Marcello, director of the Rhode Island Department of Public Works, declared that local governments must boost their taxes if they expect to meet highway needs in urban areas. Municipalities are going through an agonizing reappraisal of tax systems now, he said, in an attempt to squeeze out more revenue to meet current and future demands.

"Consideration is being given to the merging of local government on a metropolitan area basis (for a pooling of resources), and we hear the almost constant repetition of new tax schemes—possibly a local income tax—and lately, in a whisper—the urban motorist privilege tax."

In the meantime, what can state highway administrators do to help city and county governments to help themselves? He listed the following:

"We can help the local people with traffic engineering, to make certain of optimum use of existing street facilities in the handling of increased traffic. If necessary we should work in concert to develop uniform standards of construction at values which are both economical and yet serviceable.

North Atlantic Highway Officials president for 1960: J. Burch McMorran, New York state.

"Planning and programming should be co-ordinated to fit in with master plans for these areas and to reduce dislocation and further revenue loss to a minimum.

"Help explore and make available to the local communities techniques gained through experience at the state and national level.

"Make ourselves available to the local communities as consultants on highway problems.

"Make, on a state-wide scale, studies of transportation needs so that efficient over-all developmental plans can be accomplished.

"Encourage integrated system development of arterial and local street networks.

"Support uniform legislation relating to usage of higways and streets by heavy vehicles on a state and national level.

"Urge municipal interest and participation in land use, zoning and related influencing factors that tend to affect urbanized expansion and redevelopment—upon which an updated, integrated and well-designed arterial street program can be based to best serve the public and all governmental interests at the most economical cost to taxpayers."

Contractor representatives had a chance to talk over common problems with state highway engineers from the North Atlantic States at the convention. Under the sponsorship of the joint committee of AASHO and ARBA, they reviewed attempts to make the contractor's job easier. Subjects discussed included specifications, standardization of specifications especially compaction, and concrete mixing times.

Elected by N. Atlantic Highway Officials

New officials elected by the association include:

PRESIDENT: J. Burch McMorran, superintendent, New York Department of Public Works.

VICE PRESIDENT: O. Herbert Fritzsche, state highway engineer, New Jersey State Highway Department.

SECRETARY-TREASURER: Kenneth Rice, secretary, New Jersey State Highway Department.

Army Tests Electronic Survey System

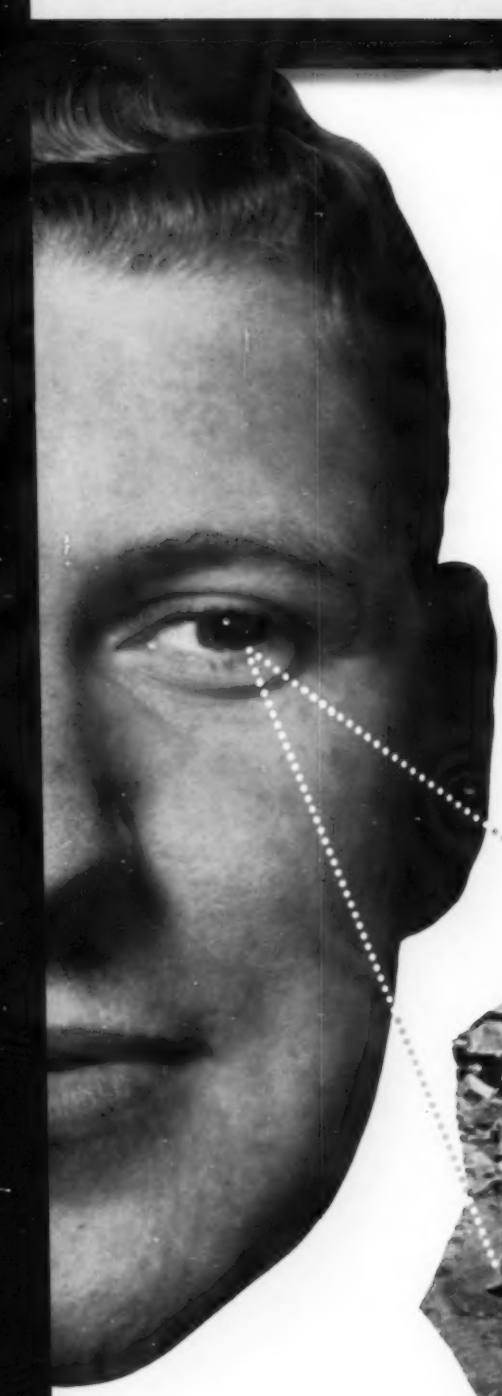
An electronic survey system that may provide rapid, accurate means of measuring distances and establishing positions is being evaluated by topographic engineers at the U. S. Army Engineer Research and Development Laboratories, Fort Belvoir, Va.

Called "Lorac", the system can be used to measure inter-island and other geodetic ties where line-of-sight conditions do not exist, and for establishing positions of boats, aircraft and land vehicles.

Utilizing a continuous-wave unmodulated radio transmission sent out from each end of the line to be measured, the system can measure distances up to 100 miles over mountains with minimum accuracies of 1:10,000. Over salt water, the range is increased to 200 miles and the minimum accuracy to 1:45,000.

To establish positions, the system employs two baselines extended from a central transmitting station and a transmitter at each end of the two baselines. Both measurement and positioning employ aircraft-mounted receiving stations.

Lorac was designed and developed by the Lorac Service Corporation, Tulsa, Oklahoma. Under contract with the Laboratories, Lorac personnel tested the system according to a test plan approved by the Army Engineer.



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Before you decide to invest in any crawler-tractor unit, . . .

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Have YOU seen an Eimco in action?

If your answer is no, you owe it to yourself and to your company to compare the modern Eimco tractor with any other make of comparable, or even larger, more expensive, size. If your answer is yes, chances are you've already ordered, or are operating, a fleet of Eimcos!

Compare how the Eimco 103 . . . the Eimco 105 . . . or the Eimco 106 lines of tractor units will outpull, outpush, outmaneuver, outperform and outlast any old-fashioned crawler tractors in their fields . . . and with greater flexibility in use. The reasons lie in Eimco's unique combination of important, exclusive features, including "Unidrive" transmission, single stage heavy-duty Torque Converter, Independent, Dual Final Drives, Up-Front Operator position, patented Unit Construction and dozens of others, too numerous to list here.

To up your profits and productivity, let one of Eimco's qualified sales engineers explain all the multiple advantages of the Eimco line of modern tractors. Just contact the dealer or sales office nearest you, or write to The Eimco Corporation, P. O. Box 300, Salt Lake City 10, Utah, U.S.A.

The 100 H.P.
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Tractor - Dozers
Front End Loader
Special Steel Mill FEL
Log Loader

The 143 H.P.
EIMCO 105

Tractor - Dozers
Excavator
Special Steel Mill
Excavator and
Front End Loader

The 205 H.P.
EIMCO 106

Tractor - Dozers
Front End Loader
Special Steel Mill FEL
Log Loader

For details and specifications on any or all of these modern Eimco crawler - tractor units, please write Dept. 1, The Eimco Corporation, P. O. Box 300, Salt Lake City 10, Utah, U.S.A.

Eimco's assembly lines are unique, in that they permit the production of machines especially adapted to your needs, without assembly interruption.

Completely automatic, your Eimco is controlled with finger - tip ease. Each handle controls one of the Eimco heavy - duty tracks. Push one forward, the other back, and you are in a smooth, true spin turn! Foot brakes for gradual turns, and no clutch or shift lever to slow operations; tire your operator.

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Backed by the skill and resources of the world-wide Eimco organization, Eimco crawler - tractors have proven themselves in use around the World. Eimco's advanced engineering and quality craftsmanship makes possible a full one-year guarantee on the entire tractor.

Look what Eimco's unique and exclusive up-front operator position does in terms of greater visibility, control and safety! Your operator can see what he's doing, where he is . . . not where he was, in terms of work. The engine is center mounted, for better balance and traction. The operator is cooler, safer, in more complete control, at all times.

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BRANCHES AND DEALERS IN PRINCIPAL CITIES THROUGHOUT THE WORLD

While welding on idler in the MacAllister shop. The operator moves a container of flux into position by overhead hoist and replenishes his hopper supply. ←

Repair Those Parts Before They're 'Clear Gone'

How an Indianapolis distributor campaigns with customers to salvage costly track elements

Track assembly parts are a big factor in the cost of owning and operating a tractor. This every owner knows but sometimes tends to forget. In the midst of a busy work season he may keep tractors running long after the rollers, idlers, sprockets, pins and bushings have worn to the point beyond salvage.

Helping tractor customers rebuild tractor gear early enough to permit salvage and rebuilding of many of the parts is the constructive role played by MacAllister Machinery Co., of Indianapolis, Caterpillar distributor for the Indiana area. This firm's specialty is prompt "stitch in time" overhauls and hardfacing build-up or replacement with genuine factory parts. This campaign has made friends among the local contractors, helping them reduce loss of productive time by scheduling repairs and rebuilding when machines can best be spared from a job.

The MacAllister headquarters shop is a completely self-contained one, spacious enough to handle several tractors and also other types of heavy construction equipment at once. Its specialty is hard facing, with Stoody materials principally.

For this work there is a Rexarc, twin-head, two Miller Sigma 5CS constant potential machine and two Miller S4400s, giving a total of eight spindles for roller and idler build-up. Track machines consist of two Miller SRs, using a Berkeley Conservall rail build-up unit (automatic submerged arc).

Sprocket re-rimming and grouser build-up with bars are done on a Lincoln MG hand welding set. Also there is an A. O. Smith transformer welder. A Rogers 150-ton horizontal press for pins and bushings helps move this work along at low shop cost.

Build-up of rollers and idlers is done usually with Stoody 105 rod, a tough, long-wearing material developed for this work. Rails take Stoody 104 which has toughness but is designed to stand more impact.

It will be interesting to glance at the MacAllister procedure for track build-up:

(1) When tracks or rollers come in from the field, a Hyster crane lifts them off the truck and spots them in position for the first needed operation.

(2) If this is to be steam cleaning, a Storm King (Malsbury) gets into action in a shop corner or in the yard.

(3) Rollers are disassembled using a Rogers 150-ton vertical press, and the parts steam cleaned, carefully inspected and assigned for build-up—if salvagable.

(4) Rollers then go the route in a Rexarc machine. During the rebuilding operation, internal roller parts are inspected for wear and needed parts ordered out for replacement.

(5) Rough spots, burns, etc., are removed either by grinding or machining. Hand grinding with a Black & Decker C pneumatic usually suffices, but some lathe work is farmed out.

(6) Rollers are rebored to size

Greasing a shaft preparatory to inserting it in the roller.

This roller is being re-bored to a tolerance of 1/1000 in.. Note MacAllister's two boring bars. The one in use will handle shafts up to 3½ in., the other at right up to 7 in.

using a boring bar—an important detail.

(7) The roller parts are then reassembled and the rollers spray painted, for which two DeVilbiss paint spray machines are on hand.

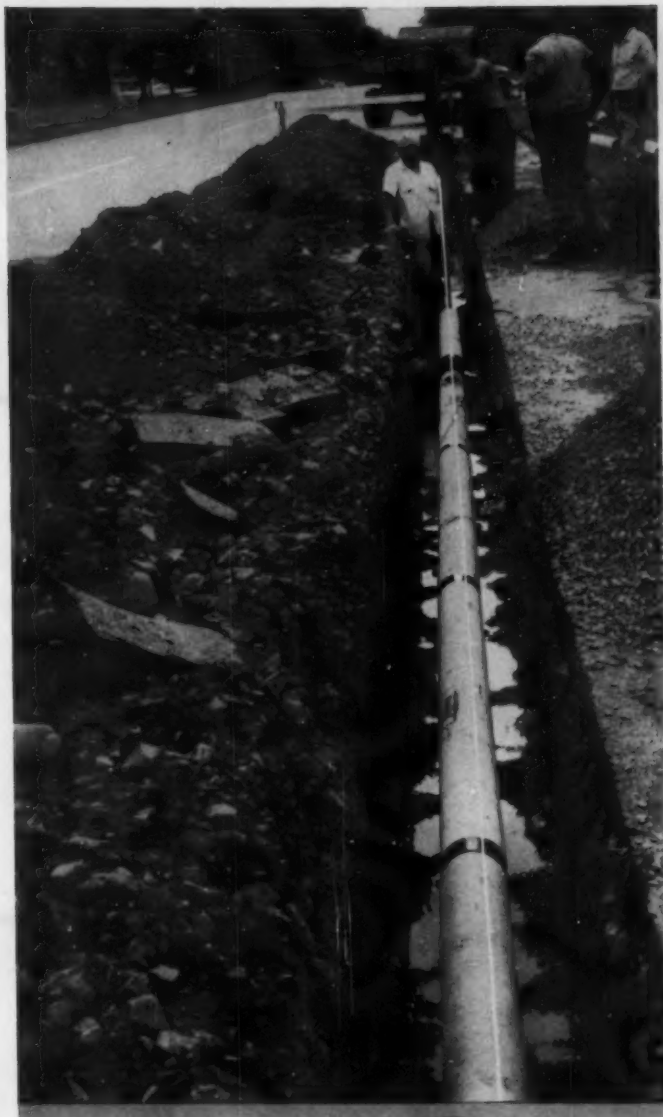
The foregoing steps are for any parts of any make or model of tractor or excavator which take circular build-up and hardfacing.

As a service to equipment owners, MacAllister keeps a stock of rebuilt as well as new rollers and idlers, ready for the customer's needs. The contractor's truck when it comes in with worn parts can go back out to the job with replacements, and in a few hours have the equipment working again. The "loaner" parts often are used only while the contractor's own parts are getting fixed up. At other times the parts are purchased on an exchange basis.

The MacAllister shop has a year-around load, but is busiest in late summer when the job casualties start to mount. This time of year the shop works night and day shifts to give quick service. Winter overhauling is a single-shift basis, since then the contractor isn't in a hurry.

Track renovating procedure is similar to that for rollers and idlers. The track is where contractors oftenest are prone to wait too long. The track is cleaned, then inspected to determine whether rails and pads are rebuildable, whether to turn the pins, etc. Usually a set of rails goes to the 150-ton horizontal track press first, where pins and bushings are either turned or replaced. If rail build-up is found necessary (and usually is), the rail goes to a Berkeley machine for this purpose. If

Continued on page 112



NEW!

for subsurface drainage...

TRANSITE UNDERDRAIN PIPE

- **Extremely good weight-strength ratio**
- **Naturally smooth interior**
- **Resists corrosion**
- **Assures low frictional resistance to flow**
- **Excellent alignment, tight joints, low material cost for new installation economies**

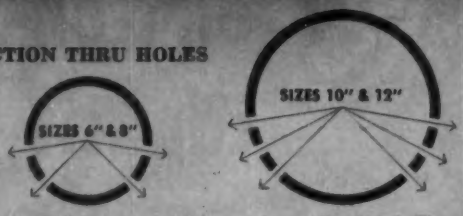
For highways, airports, dams, industrial plant sites—anywhere there's a subsurface drainage job to be done—Johns-Manville Transite® Underdrain Pipe does it effectively and economically.

The plastic coupling used with Transite Underdrain Pipe assures a permanently tight, *flexible* joint . . . keeps out waterborne silt and maintains permanent pipe alignment. And, because of Transite's long (10 ft. and 13 ft.) lengths, fewer joints are needed in the line.

Made of tough, durable asbestos and cement, Transite Underdrain Pipe won't rust. Its interior is made smooth to stay smooth, assisting the flow of water and reducing the opportunity for solids to find a resting place in the line. As a result, the perforations are able to perform their function of permitting entry of ground water into the line , at a maximum rate, where it can be quickly carried off.

Transite's low material cost, installation and maintenance economies mean important savings from the time it is specified until there is no longer a need for the line. Let us send you, without obligation, our book TR-246A. Write Johns-Manville, Box 14 (RS-5), New York 16, N. Y.

SECTION THRU HOLES



The minimum crushing strengths* of Transite Underdrain Pipe for subsurface drainage systems are shown in the following table:

PIPE SIZE (inches)	TOTAL APPLIED LOAD PER LINEAL FT. (pounds)	PIPE LENGTH (feet)
6	1,000	10
8	1,000	10
10	1,100	13
12	1,200	13

*A.S.T.M. 3-edge bearing method
A complete line of fittings is available including elbows, tees, wyes, crosses, end caps and increasers.

JOHNS-MANVILLE

. . . for more details circle 337 on enclosed return postal card

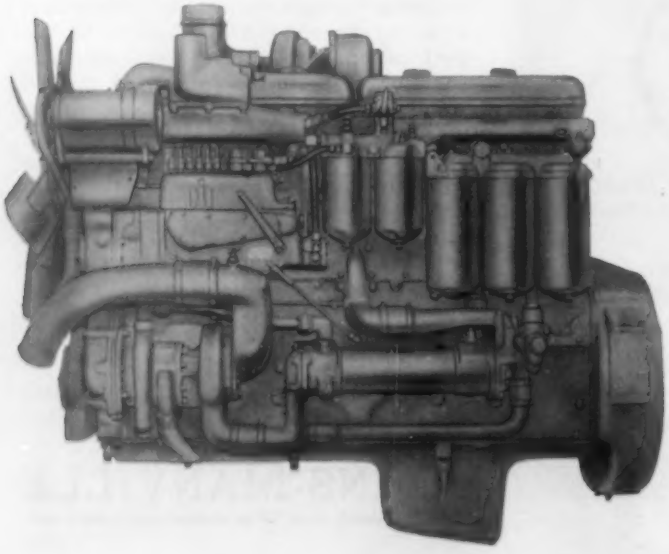
How BRAWN-BACKED Payscraper® features give you stepped up . . . loading

From power plant to push-block, the 34-cu. yd. International 295 Payscraper gives you an exclusive combination of features that step up dirt-on-fill delivery! Compare quiet, big-capacity DT-817 Payscraper power. Try the advantage of up or down, on-the-go, Payscraper power-shifting that provides load-speeding *automatic* direct-drive lock-ups in second, third, and fourth gears! Measure *extra value features* like safe, effortless power-steering—that leaves "the steering feel in the steering wheel." Note how exclusive torque-cushioning planetary drive axles add dependability to rough-and-tumble earthmoving! See how 122-inch bowl width speeds loading and unloading—adds control ease and stability, loaded or empty. Prove on your job that bonus performance "rides" the Payscraper bowl. Choose the 2-axle "295"; or 3-axle, 34-cu. yd. "495." See your International Construction Equipment Distributor for a demonstration.

. . . roading

Payscraper power-to-payload punch tops all other rubber-tired rigs—because the fast-slugging, high-torque International DT-817 diesel is the Payscraper power plant! The 375-hp, turbocharged DT-817 gives you direct, push-button starting; all-altitude high-efficiency performance; power for top rim-pull to help speed all steps of the cycle; time-saving "no-lag" control power!

. . . dirt-on-fill capacity!



Even "dead" sand comes alive and "boils" fast into the Payscraper bowl. Every detail of Payscraper design aims at speeding the cycle, and *staying available!* The 21-inch diameter steel cross tube provides super load-bearing strength and resistance to impact. Bowl "backbone," draft arms and side reinforcing members all are massive high-strength box-section steel weldments. "X"-member reinforcing maintains perfect push-frame alignment at all times. And the 4-speed, planetary-type, torque-converter power-shift transmission automatically adjusts torque and load to speed — to maintain full capacity!

You steer the 140,000-lb. loaded Payscraper almost as easily as a 3,600-lb. automobile! Payscraper gives the big control advantages of (1) exclusive International rack-and-pinion plus tandem pump steering system; and (2) 3-degree forward spindle pitch that improves scraper balance and prevents "nose downs" in high-speed turns. The 16-adjustment, bump-smothering seat builds operator confidence, too. And reach-easy power brakes, "control tower" vision, and flush deck safety help him deliver full Payscraper capacity, and take advantage of speeds up to 33.5 mph. He commands ample power and traction to pull *directly* out of 90-degree turns, even on soft fills!

The fast, positive-acting Payscraper ejector mechanism is powered by the International PTO-driven Cable Control Unit. One cable drum of this simple planetary system actuates the apron and ejector; the other drum positions the bowl to control spreading action. Apron lifts to a big 94-inch opening. Two ejector-plate pushing members apply dozer-like action to force out the whole 34-cu. yd. load cleanly. Action of six heavy-duty springs, stretched during ejection, positively powers the ejection mechanism's return!

Here's your 76-page cost and production estimating book—newest, most authentic and complete guide for estimating material-moving costs—and for selecting equipment combinations for top profits, *anywhere!* Yours for the asking from your International Construction Equipment Distributor!

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International Harvester Co.,
180 N. Michigan Ave.
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A Complete Power Package

International® Construction Equipment

Prior to re-boring, roller shafts are cleaned out with a pneumatic air brush.

Installing roller plates and cap screws on rebuilt rollers. To save the customer's money, MacAllister will re-use the screws if they are in proper condition, and will reverse the plates.

An idler being built up in tilt position as the operator handles the controls of his Rexarc unit.

REPAIR THOSE PARTS

Continued from page 108

grousers also need building up, they go to the hand welding area of the shop.

Tracks handled while mostly from tractors also include tracks from shovels, draglines and loaders. Tracks of course are not painted.

Sprockets for undercarriages get their treatment beginning with a re-rimming. This can be done on or off the tractor, and is strictly hand welding work here. Rod used is E70-18 Atomarc (Alloy Rods Inc.), a low hydrogen rod having ability to weld higher carbon steels.

There is usually no build-up of teeth—new rims are cheaper and better and new Cat factory built rims are carried in the parts room. On a D8 tractor for example, re-rimming can save the owner more than $200 over complete build-up without new elements.

This firm also does complete overhauls including engines. Its service department has 30 mechanics, welders, paint men and helpers. Ten Ford, Chevrolet and Dodge service trucks do trouble shooting in the field, on call from contractors. A squad of mechanics will overhaul a machine on the job on quick notice, where the contractor is not set up for it—saving the cost of a trailer haul into some shop. Or a trailer shuttle picks the machine up if preferred. This service covers 71 Indiana counties, aided by two outlying parts warehouses.

General shop facilities include, beside engine overhauls, renovation of transmissions, torque converters, clutches, fuel injection systems, electrical and hydraulic. Caterpillar factory parts comprise most of the $400,000 plus inventory of parts and accessories kept in stock (supplemented when needed by a 46,000-item parts depot maintained by Caterpillar at its regional depots to support its dealers.

Traded-in equipment, significantly, is overhauled and put in top shape in a separate shop.

All this means a volume operation that seems to bring cost benefits to all concerned. Stoody hard-

Readying a length of rail for pin and bushing removal on the 150-ton horizontal press.

facing wire, for example, is purchased in 10,000 lb. quantities. Linde and Unionmelt flux is bought 4,000 to 8,000 lb. at a clip, and is not reclaimed. Oxweld materials (25M bronze) are on hand for brazing cracked castings.

Many refinements in shop techniques are in evidence, credited often to the ingenuity of employes. To keep the bed of the track welder warm at night (and reduce distortion) it is kept warmed by a portable fuel oil heater. Result: more accurate track fitting.

Heading up this service for MacAllister Machinery Co. under president P. E. MacAllister, is Eugene York, service manager.

Concrete Joint Group

Concrete Joint Institute is the official name of the association of premolded joint manufacturers formerly known as Expansion Joint Institute, Harry G. Meadows, president, has announced. Other institute officers are James C. Whitney of Celotex, vice president; and Wallace C. Fischer of Servicised, treasurer.

The Institute with headquarters at 360 North Michigan Avenue, Chicago, was organized in 1955 by The Celotex Corporation, W. R. Meadows, Inc., Servicised Products Corporation, Presstite Division of American-Marietta Company,

Harry G. Meadows

and The Philip Carey Manufacturing Company.

It it dedicated to advancing the roadbuilding art.

Supporting piles in place.

Back section set on piles.

Two-Piece Precast Pile Caps Speed Bridge Construction

By Douglas McKnight
Engineer, Lincoln, Nebraska

Replacement of antiquated small bridges has been greatly simplified during recent years by the development of pre-fabricated bridge decks and the use of diesel-type pile hammers. There are many bridges which rest upon pile supports. When a deck of prefabricated construction is placed upon these pile supports, it becomes desirable to have pile caps which also will be of permanent construction.

It is customary to erect forms and place the concrete for pile caps in the field. This is an expensive and time-consuming part of the work which is subject to delay by weather conditions. A two-piece precast pile cap can solve this difficulty and eliminate the placing of any concrete in the field. The cap beams pictured are made in two interlocking pieces which are L-shaped in cross section. When placed on the driven piling and bolted in place, the beams exert a clamping action on the pile heads.

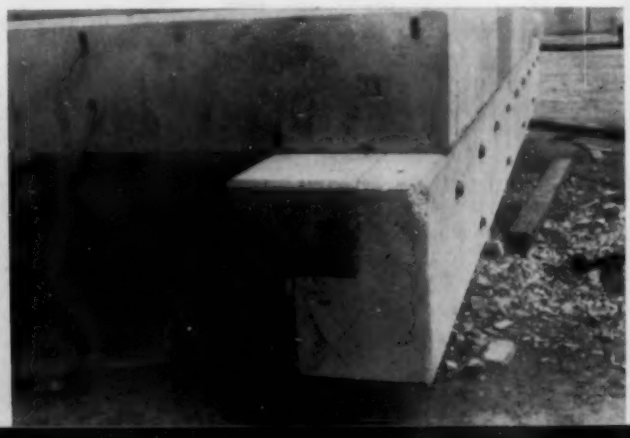
The two-piece cap was developed because the actual standard pile cap 2 ft. x 2 ft. in cross section, weighs about 600 lb. per lin. ft. The standard roadway width requires a cap at least 24 ft. long, and the weights of the individual precast caps in one piece become too heavy to be handled by the equipment usually available locally. By dividing the load into two parts, field erection is simplified and made safer, because the slots into which the pile heads are inserted are exposed on the face of the lower cap section which is placed first upon the pile heads.

The actual fabrication of the caps in a precasting plant is a simple operation. Half the cap is formed and poured, the second half then poured in the same form. A perfect match is obtained by coating contact surfaces with bond-breaking material and pouring the second section against the first section to obtain a perfect match.

As the manufacture of this two-piece cap does not require a large expenditure for forms, it is felt that the ready-mix plants and products manufacturers throughout the country will be interested in fabricating caps and serving the areas where they now deliver ready-mix concrete.

Setting the front section.

The completed assembly bolted together.

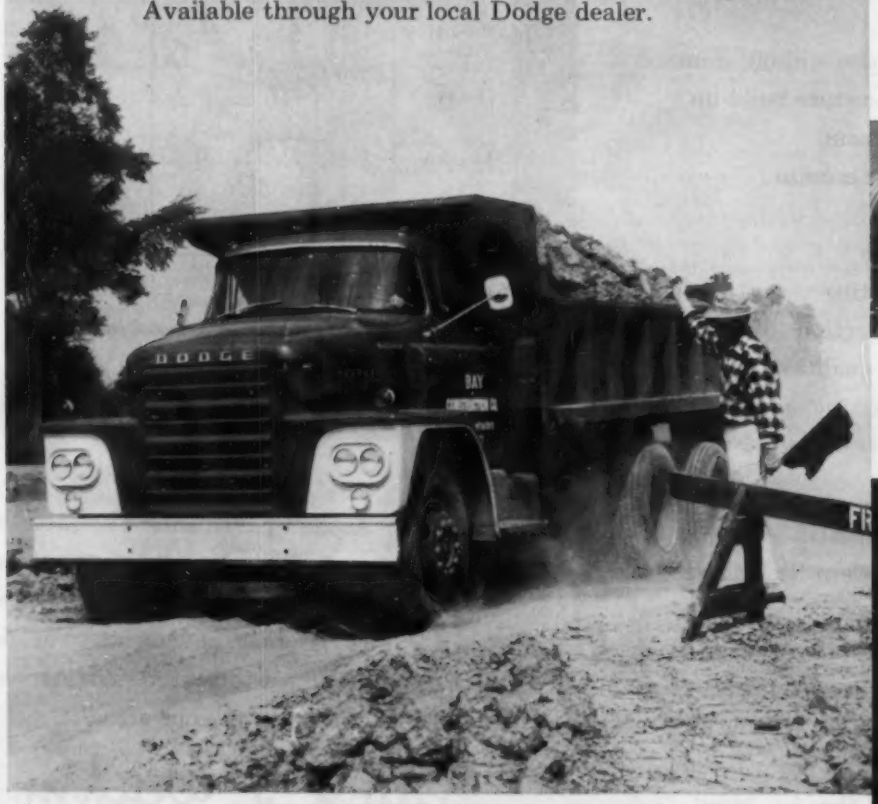


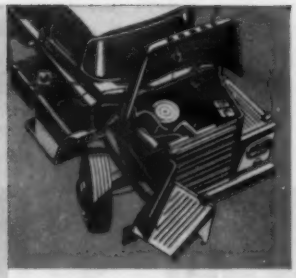
NEW DODGE CAB-FORWARDS thrive on tough construction jobs

They're built big to work big, these brawny new Cab-Forwards by Dodge. And, to fit any job, there are models ranging from 15 to 53 thousand pounds G.V.W. Available in tandem and single-rear-axle models. Straight trucks and tractors. Gasoline and Cummins diesel power.

Just 89¾ inches from bumper to back of cab, these heavyweights have handling qualities akin to half-tonners. And their engines are positioned for easiest service access through exclusive Servi-Swing fenders.

For greatest hauling efficiency and economy on tough construction jobs, your big buy is Dodge. Available through your local Dodge dealer.





SERVI-SWING FENDERS open out at the pull of a latch to let a man walk right up to the engine for unrestricted servicing. This exclusive Dodge feature spares you the extra cost and bother of a tilt-cab model.

NEW GAS AND DIESEL ENGINES let you pick the kind of power best suited to your requirements. Gas V-8's from 178 to 228 hp.; economical Cummins diesels from 175 to 220 hp., up to 743-cu.-in. displacement.

TOUGH DODGE FRAMES of heat-treated, chrome-manganese steel provide exceptional load support while reducing excess chassis weight for C800 models and up.

DEPEND ON
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TO SAVE YOU MONEY IN
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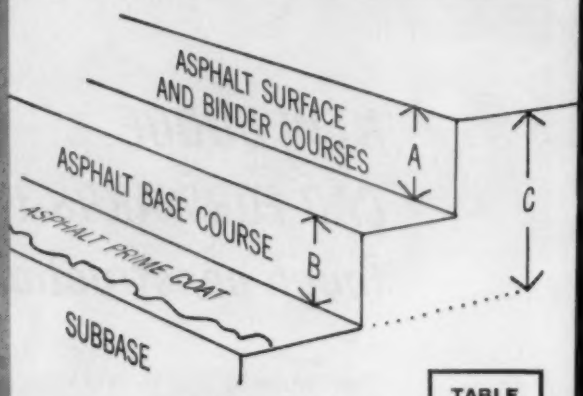
"DEEP-STRENGTH"
ASPHALT CONSTRUCTION

...a giant step forward in basic highway design

- Lower stresses on subgrade
- Reduces total pavement structure thickness
- Improves many lower-quality aggregates*
- Is not susceptible to frost damage
- Protects subbase from rain during construction
- Permits haul traffic on base without damage
- Eliminates subsurface moisture build-up
- Aids uniformity of pavement
- Does away with shoulder erosion
- Minimizes slope erosion
- Furnishes better drainage
- Prevents wheel-track rutting
- Provides for stage construction
- Improves surface riding qualities
- Increases driving and parking safety

**For use in areas where high-quality aggregates are in short supply.*

SUMMARY OF **ADVANCED**



PAVEMENT DETAIL

TABLE 1

Recommended Minimum Thicknesses of Surface-Plus-Binder and of Base Courses (inches)*

TRAFFIC	A**	B w/ Asph base	B w/o Asph base	C w/ Asph base	C w/o Asph base
Very Hvy	4	4	6	8	10
Heavy	3	3½	5	6½	8
Medium	3	2	3	5	6
Light	2	2	3	4	5

**For thickness of subbase and improved subgrade courses, see Asphalt Institute Manual Series No. 1.*

***May be reduced by substitution of Asphalt base of comparable strength on inch-for-inch basis.*

"THE INCREASING STRESSES now being imposed on pavements by modern heavy traffic with average tire contact pressures as high as 100 psi or more, and the anticipated future increase in wheel coverages indicate that general improvements in design and construction must be made. To meet this need, The Asphalt Institute calls to the attention of highway designers the Advanced Design Criteria given in broad detail above and designated, 'Deep-Strength' Asphalt pavements. The Institute strongly recommends the adoption of these Advanced Design Criteria in the construction of all future heavy-duty Asphalt pavements. For detailed data, you are urged to contact The Asphalt Institute District Engineer in your area."

Austin S. Wellborn

CHIEF ENGINEER

DESIGN CRITERIA for "DEEP-STRENGTH" ASPHALT PAVEMENTS

RECOMMENDED MINIMUM COMPACTION CRITERIA* (summary)

TABLE 2

Non-Asphalt Courses

COURSE	MINIMUM (% modified AASHO Density)
Subgrades (layers not to exceed 6 inches)	
Cohesive	95%; top 12 inches 90%; balance of fill (When optimum moisture is near plastic limit, compact at moisture content approximately 1% below theoretical optimum).
Cohesionless	100%; top 12 inches 95%; balance of fill
BASES, SUBBASES AND IMPROVED SUBGRADES (Layers not to exceed 6 inches)	
All (*proof roll with heavy rubber-tire rollers*).	Compaction load and contact pressures as high as material will support without undue rutting or displacement.

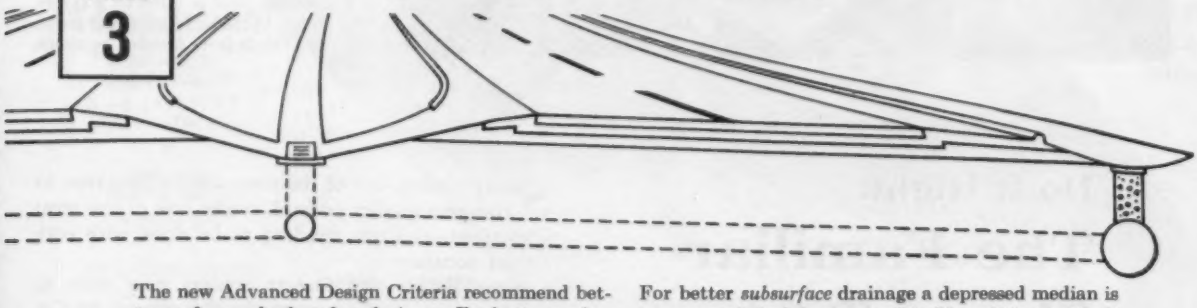
ASPHALT COURSES (base, binder, surface)

COURSE	MINIMUM CRITERIA
SUPPORTING COURSES	Flat steel-wheel rollers to be supplemented with pneumatic tire rollers having average tire contact pressures of 85-110 psi
SURFACE COURSES	Same as for Supporting Courses.

**For detailed information see The Asphalt Handbook, Manual Series No. 4.*

TABLE 3

FULL-WIDTH DRAINAGE (Typical Cut Section)



The new Advanced Design Criteria recommend better surface and subsurface drainage. For better *surface* drainage full-width paving is recommended. On elevated grades the water should be directed to Asphalt spillways by means of Asphalt dykes or curbs constructed on the extreme outside edge of the shoulder.

For better *subsurface* drainage a depressed median is recommended wherever possible. If conditions make it mandatory to construct an elevated median, transverse drains should be connected with a longitudinal drain in the median deep enough to collect all ground water before it can find its way into the pavement structure.

NEW HANDBOOK! Now on the presses is a new edition of *The Asphalt Handbook*. It incorporates all the Advanced Design Criteria for highways implied by the term **Deep-Strength** Asphalt Construction. It also includes the latest design and research data concerning other major uses of Asphalt . . . for ditch linings, embankment facings, etc. Copies will soon be available at The Asphalt Institute office serving your area.

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Asphalt Institute Building, College Park, Md.

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1 Slump cone is filled in 3 layers, each ⅓ the volume of the mold, and each layer tamped 25 times.

Do It Right:

The Familiar Slump Test

Slump testing, one of the most widely used tests in concrete quality control, is also one of the most important—and one needing to be done with consistent accuracy.

Some Roads and Streets readers may wish to brush up on the fine points in the correct ASTM procedure. The accompanying photos showing a simple way to conduct this important standard test were supplied by Edward E. Brush, vice president, Soiltest Incorporated.

2 Slump cone is removed from the concrete, and mixture allowed to settle as much as its consistency will permit.

3 Measuring slump with tamping rod and ruler. Distance from top of cone to top of metal form is carefully measured to determine "the slump."

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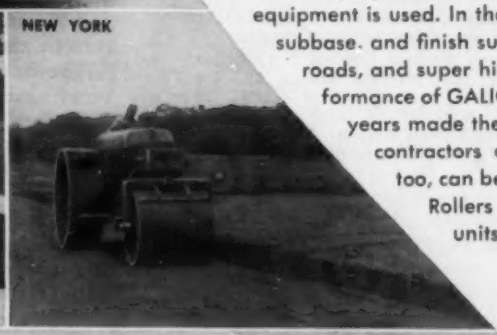
GEORGIA



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FIRM or DEPT. _____

STREET _____

CITY_____ STATE_____

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Heading AGC for year ahead: President-elect John A. Volpe (right), John A. Volpe Construction Company, Malden, Mass. He is former interim Federal Highway Administrator, and a former state highway official.

Vice-president-elect M. Claire Miller (left), of San Ore Construction Company, McPherson, Kansas. Miller is a past chairman of AGC's Highway Contractors' Division.

New officers of AGC's Highway Contractors' Division: H. L. Royden, Royden Construction Co., Phoenix, Arizona, president; R. W. McKinney, contractor, of Nacogdoches, Texas, vice-president.

AGC CONVENTION

Continued from page 77

waste, over-design, excessive cost, etc.) is a case in point.

Teer quoted federal highway administrator B. D. Tallamy, saying that the only sure-fire way to sell the public on the Interstate roads is to open up stretches of such facilities to public use.

Following Nello Teer's review, M. Claire Miller, AGC vice-president-elect and past-chairman of AGC's highway contractor division, took up the selling theme. He said that highway contractors for many years have been spoiled. They have enjoyed an automatic market for their services; very little effort has been needed to show Congress cause for extending highway financing biennially at the established levels, and state fund sources have been on the rise. Now, with the greatly enlarged federal interest, the road program is no longer a self-maintaining market. He suggested that every AGC highway chapter get busy at home.

Owner-Operator Again. Elsewhere on the morning program, the continuing legal cloud that hangs over the status of the individual truck owner-operator came in for review. With Pat Gibbons, chairman of AGC's highway contractor division, presiding, Art Hintze of the AGC staff reviewed the tangle. It remains one of the serious problems under the Davis-Bacon Act, as discussed extensively at AGC's mid-year board meeting in Kansas City last fall (See *Roads and Streets,* October, 1959).

The Labor Department has shown little disposition to soften its stand that the owner-operator must be treated as an employe. This means that he must go on the payroll, with records kept of his wages and hours, and that he must be guaranteed a return on the use of his truck.

The Bureau of Public Roads has taken a strong stand against this concept. During the time Mr. Volpe was interim federal highway commissioner, the situation remained under control. More recently matters have deteriorated, despite strong effort by federal highway administrator Tallamy and staff. The Labor Department's position makes it virtually impossible for the highway contractor to use owner-operators on an economic basis. Despite every attempt to reason with them, Labor Department people haven't responded. They seem to feel "they have the power to regulate, and that's that." Presently a sort of moratorium is in force thanks to BPR effort, but this doesn't clear up the legal status.

In recent weeks, however, there are signs that the Labor Department is weakening, the San Francisco delegates were told. The unacceptability of its stand is such that it has found difficulty in defending individual decisions. Hintze told of certain cases, such as in a 90-mile cement haul, where concessions have been made under local pressures to permit the haulers to operate as independents.

If the Labor ruling were enforced completely across the country, said Hintze, it would bring chaos to the contractors. The Bureau is continuing to work toward a reasonable and equitable solution.

The Wages-Hour people in Washington are also making concessions, this speaker said. Where the contractor has a written agreement with owner-operators on a rental rate, and this agreement is followed, the agreement is being accepted by some district labor representatives but not by others. Again, this is a very unsatisfactory situation, and one in need of clearing up.

AGC-AASHO Joint Committee. One of the most constructive efforts supported by AGC contractor members is the work of the AGC-AASHO Joint Cooperative Committee. This group is currently headed by M. Claire Miller, Kansas contractor, for AGC, and W. A. Bugge, Washington state highway director, for the highway officials. Bugge reviewed the various matters on which steady progress has been made with the highway departments.

One subject is the highway departments' practices on retained percentage and slowness of payments. The status in some states is such that the contractors literally have helped finance the highway department's current operations. Over $500 million of such funds were due contractors on a recent date, although the situation is improving somewhat.

Such practices, it was pointed out, increase the cost of the road program because they add to the contractor's cost of doing business.

Uniformity in state highway practice is still lacking with respect to retained percentage on contract jobs, a recent survey reveals. The committee's recommendation is that a performance bond be executed in lieu of the state holding back a percentage, to protect the state interest. Also that payment be made promptly on materials delivered to the job, as is now being permitted under an amendment of the federal highway act.

The practice of holding back 20 to 30 percent of the contractor's money is a serious burden on the contractor, and an unfair one, a committee spokesman concluded. He also said that the states will be asked also to make final payments more promptly, usually within 60 days.

Other joint committee topics:

1. Bid advertising should be published not less than three weeks ahead of the letting.

2. The states are urged to make approved aggregate sites available to the contractor at cost.

3. Lack of prequalification continues to be a matter of concern in a few states, and the committee is seeking action by the lagging state highway departments.

4. States in some instances need to reappraise their policy on sizing of contract jobs. A balance of large and small projects is favored by the committee, as best for the contractors and the road program, in that it assures bid opportunities for all.

Subcontracting. Not on the program was a question popped from the floor by a North Carolina contractor. Would the delegates endorse a softening of attitude toward the Bureau of Public Roads ruling on subcontracting? This ruling now limits subbing to 50 percent, although informally the percentages have been allowed to go higher in some states under one subterfuge or another. The delegate said that more subcontracting would be an advantage on complex package urban road contracts in his state.

A Kansas spokesman during the ensuing discussion said that in his state, and also others, the award policy favored letting grading, structures and paving separately, and in smaller contracts; all in all, he was against easing the 50 percent rule.

The AGC's established policy stand against excessive subcontracting in highway work was cited, along with its reasoning. Many contractors feel that this would lead to brokerage type operations such as prevail in some building work, with the evils of bid shopping and peddling. The question of endorsing the relaxation lost on a show of hands.

The General Accounting Office in Washington meantime has been looking into subcontracting, the audience was told. Cases of 100 percent subbing of federal-aid road jobs have been reported, and different districts of the Bureau have not administered this matter with a uniform eye.

The overall picture of AGC's Highway Contractors' Division was outlined briefly by division manager J. M. Sprouse. The division under 1959 chairman J. P. Gibbons, Gibbons & Reed, Salt Lake City, continued work on market development, highway educational work, legislative goals, and on work assigned to specific committees such as the one on contract forms and specifications. Within the division's scope also is the work of two of AGC's numerous joint committees formed with other bodies, dealing with highway and aviation officials.

The culminating event at the highway session was a press conference on the national road program, held on the auditorium stage in front of movie cameras for later use on TV and elsewhere. John A. Volpe, AGC president-elect and former interim federal highway administrator, served as moderator. The panelmen on stage were Congressman Gordon Scherer, House Subcommittee on Roads; Bertram D. Tallamy, federal highway administrator; A. E. Johnson, executive-secretary, American Association of State Highway Officials; and Randolph Collier, California state senator.

This half-hour presentation went into some of the troubles which beset the federal highway program, and informally and objectively brought out facts which will, it is hoped, leave listeners better informed.

Profit Pinch Not on Agenda at AGC Convention

Not on the formal program but on the minds of the contractors who gathered at the AGC convention in San Francisco in March, was the indication of a tough competitive battle for the available jobs through 1960. This was noted to be the outlook throughout the entire construction industry, not just for highway work.

The profit-pinch outlook was the theme of a dispatch published in the *Wall Street Journal*, March 29 edition. Norman Miller, this not-always-conservative paper's correspondent in San Francisco, reported that despite the seemingly rosy picture, with a record or near-record U. S. construction contract volume of $77 billion in sight for 1960, the contracting industry "finds productive capacity outstripping its market." The result is "fierce competitive bidding that threatens a profit squeeze."

The dispatch quoted Max C. Harrison, Pittsburgh contractor who testified recently at a congressional committe hearing that highway bid prices were down 3.4 percent during the last two years while material and labor prices went up. "The contractor's woes are good news to public bodies and private firms planning construction this year," the *Journal's* story added.

The competition is blamed on the rise in contractor capacity, credited as being 40 to 50 percent up in the last five years, compared with a job volume that has risen only a small percentage in some areas. "Some contractors can handle three times their present work without any strain," the dispatch quoted William E. Dunn of AGC headquarters as saying, with Dunn however adding that the capacity estimate figures are really academic.

New machines, new ideas

5 Michigan Tractor Scrapers and a 600 hp Michigan Tractor Dozer, on Southwest Interstate job, move 8,750 tons daily

Some new equipment and some unusual techniques are helping M. M. Sundt Construction Co., Tucson, Arizona, get an important 20% increase in production.

The new equipment includes *five* 375 hp, 29 yd Michigan Tractor Scrapers and a big *600 hp*, 104,000 lb, Model 480 Michigan Tractor Dozer. The Scrapers are being push-loaded by the Dozer with an average of *35 tons in 35 seconds* . . . this weight is extremely accurate since *each load is being weighed*, according to Arizona state regulations, by a state representative on a truck-type platform scale.

Borrow sprinkled 7 days

The unusual techniques were developed to speed dirtmoving and to more easily meet strict compaction specs. For

On this job, all loads are being scale-weighed. Records show faster, easier-loading Michigans are moving 20% more paydirt per day than similar-sized pans formerly used. Owner Sundt (left) also likes Michigan "design simplicity, ease of operator training," plus "best service I've ever seen, both from factory and dealer." Distributor is Western Machinery Co, Phoenix.

600 hp Michigan Dozer heaps 29 yd Michigan Scraper in 35 seconds.

increase production 20%

example, before digging starts, the dry, sun-baked borrow area is laced with perforated pipe. Water sprinkles out night and day for about a week. Once the soil is saturated seven to nine feet deep, Sundt turns off the water, removes the pipe, brings in his earthmoving machines. Pre-wetting, say men on the job—a 5.3 mile, $1,031,000 section of Tucson-Benson Interstate Highway—makes for easier loading. It also has eliminated the clutter of water wagons and motor graders and extra sheepsfoot rollers which previously kept scrapers waiting in line to unload.

Success with Michigan Tractor Shovels prompts purchase of Scrapers, Dozer

Both the Michigan Scrapers and Michigan Dozer arrived on this job in mid-contract. "It wasn't that we were doing badly with our existing scraper-pusher fleet," explains Don Kellogg, Sundt's equipment supt, "it's just that we thought we could do better. We had excellent experience with Michigan *Tractor Shovels*, and so, because they have the same power train design, expected the same results with Michigan Scrapers and Dozers. We got 'em too. Moving 119,500 yds roadway excavation, 644,100 tons of borrow, 242,400 tons select and 49,000 tons aggregate base, we should finish 30 days ahead of schedule, *without changing our work day!*"

Higher scraper production is one reason, of course. Less downtime is another. "And good visibility," Ferris Ray, project manager, points out, "has reduced waste time. Scraper and Dozer operators can always see each other. No one has to blow horns or ring bells or stand up. Just a few simple hand signals coordinates all work.

Load at 7½ mph

"Scrapers load the 2800 lb/yd silty caliche mixture in second gear (7½ mph). They power-shift instantly to third (15 mph) as they're shoved off . . . move to and from the fill at speeds up to 30 mph . . . positively eject all loads." The result is 50 two-mile cycles *per Scraper* per 8-hour shift . . . 8,750 tons total . . . 20% more paydirt then previously moved by same size fleet of another make.

"The Monster"

The Michigan Model 480 Tractor Dozer is proving a remarkable pusher. The men have dubbed it The Monster. "It sure has power!" says Clay Smith, operator. "It loads these big Scrapers fast (usually in second gear 7½ mph) . . . backs up fast . . . goes from one borrow area to another fast (15 to 28 mph).

"In fact," continues Smith, "there isn't much this Dozer can't do fast. I've trimmed on 2-on-1 slopes and push-loaded on a 2-to-1 slope. I'll admit I wasn't too happy when I was told I had to run the Model 480. I'd been a crawler man for years. But I sure changed my mind! The power-steered, power-shifted 480 is much easier to run—in fact, when I climb down off the machine at the end of a day, I'm still rarin' to go."

Built-in scarifier

Where borrow is tight and tough, an optional Model 480 attachment, blade-mounted scarifier teeth boost production. When dozing or pushing forward, these teeth fold up, out of the way. But on return operator drops blade, teeth jut out and rip 8 inches deep . . . just right for the next scraper pass.

Michigan units like these are helping dirtmovers all over the country boost production. Three Scraper models—10½, 19, 29 yds—four Dozers—162, 262, 375, 600 hp—are now available. Your Michigan Distributor will be glad to show them to you.

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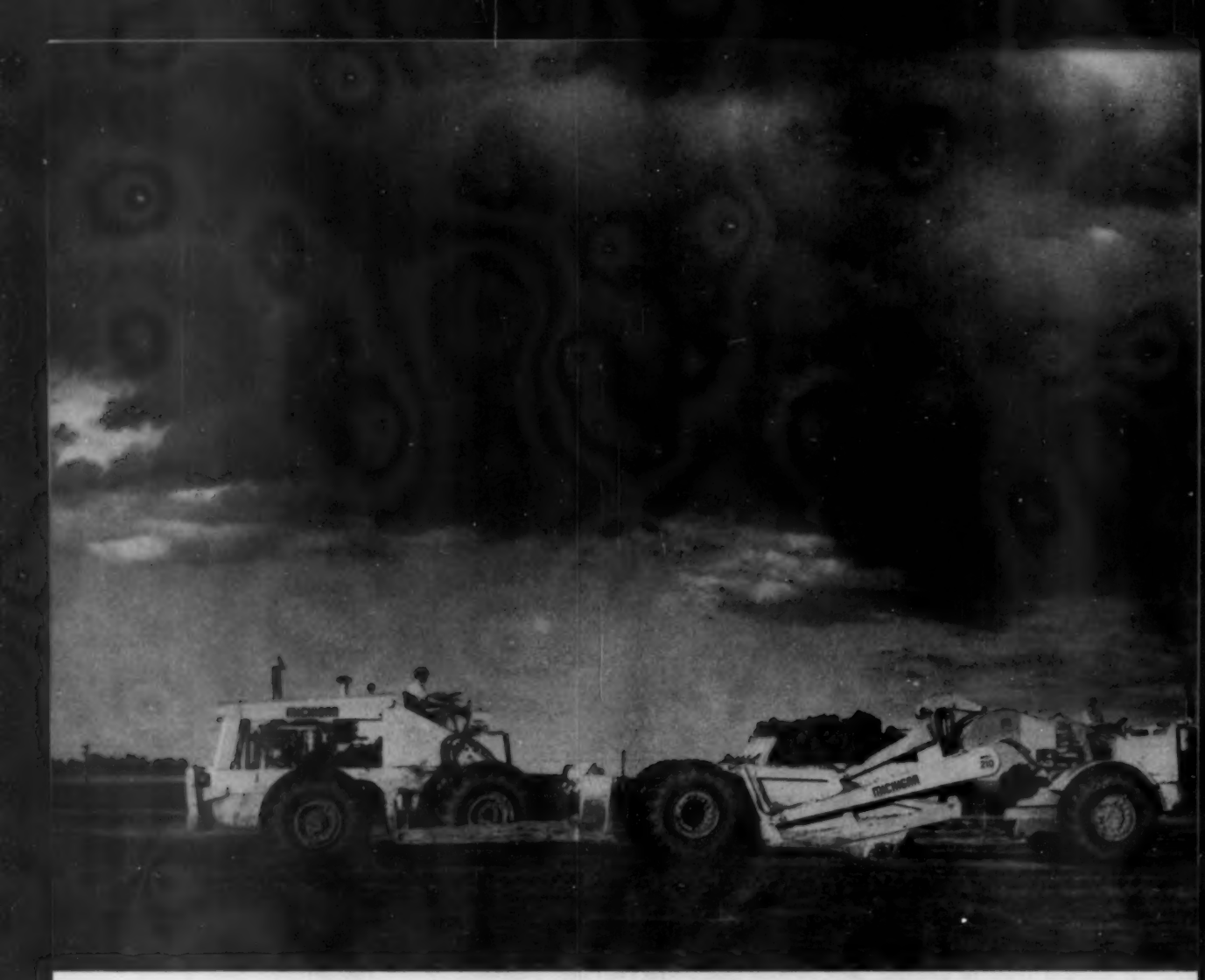


Speed was the answer to lost time caused by rain. Pushing in both directions at 4 mph . . .

Michigan Dozer loads

The forecast was for rain . . . and more rain. Same forecast yesterday . . . and the day before . . . and the week before. Already, Anderson Earth Construction Co, Calgary, Alberta, had lost 25 shifts. Even worse, only 40 shifts or so were left before freezeup. The job—500,000 yds of borrow, plus 40,000 yds of common excavation on a 3.14 mile stretch of new Highway #2 south of Calgary—*just had to be completed!*

Fleet includes two Michigan Scrapers

Even under this pressure, William Anderson, owner-manager of the firm, had a team he felt confident of—two 19 yd Michigan Tractor Scrapers, two 18 yd units and a rubber-tired 262 hp Michigan Tractor Dozer. Speed was the factor, felt Mr. Anderson, which could get the job done. "Basically," he says, "our confidence was founded on a loading method made possible by the Tractor Dozer."

This Michigan, *like all Michigans*, had the same gears, and speeds, both forward and reverse. Equipped with a pusher-block in the rear, it could push either direction with the full power of its 262 hp engine equipped with torque converter. Thus, by loading scrapers in alternate directions, all turns and all backup time would be saved.

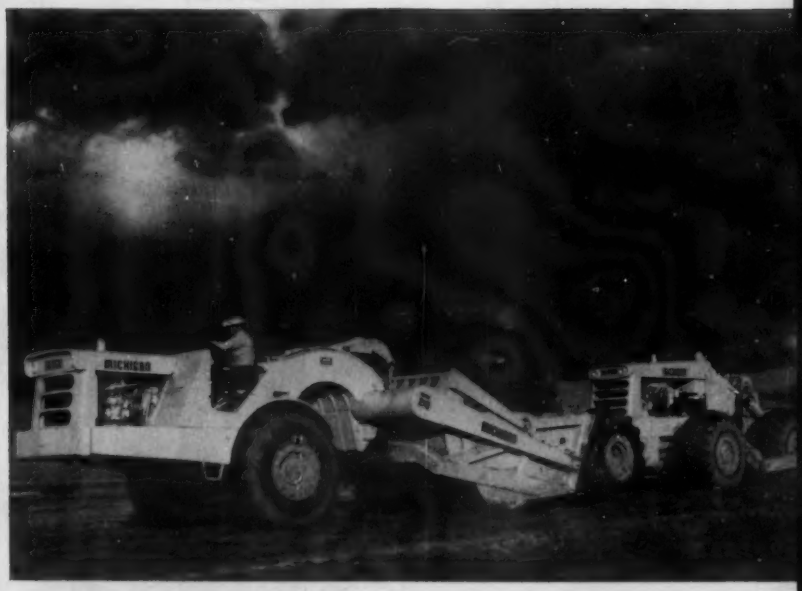
Average load time —35 seconds

And so the final phases of the wet job proceeded. Load times in the water-soaked clay ranged from 25 to 45 seconds. Most pushes were made in second gear, averaging 4 mph. Loads averaged 14 to 15 pay yds. Even in this slippery footing, the Tractor Dozer with 29.5-25 hydroflated tires, four wheel drive, and a working weight of 56,680 lbs, had plenty of traction.

Dozer services 4 scrapers despite hauls under 1000 ft

Cross-sections showed it loaded 832

Michigan Dozer, pushing in reverse, heap-loads 19 yd Michigan Scraper with heavy, moist clay in just 35 seconds.



Push-blocks, front and rear, save backup and turning. In either direction, Model 280 Dozer heaps scrapers at about 4 mph.

832 pay yds per hour

pay yards per hour. This average was maintained hour after hour despite working conditions that were really rough on the operator. A standard 12-hour shift, for example. Four scrapers to push-load, one more than usual, even though most hauls were under 1,000 ft one-way. The loading pattern of alternating directions of push which while it cut waiting also gave the Dozer operator virtually no time to rest. Yet, because of its ease of operation, the Michigan Dozer and its one operator produced as much in their 12th hour of work as their first—an average of 10,000 pay yds per day.

Strips overburden, too

Michigan speed had another advantage. With a top speed nearly equal to the scrapers, the dozer traveled from one of the job's eight borrow pits to the next in a matter of minutes. Generally, it would go in ahead of the scrapers and quickly strip two to three feet of overburden before loading began.

"I'm convinced," says Mr. Anderson, "that these rubber-tired tractors will move a lot of prairie dirt in the future. They've sure got the speed."

Perhaps *you*, too, would like to be convinced of Michigan Tractor Dozer power and capacity on *your* job. There are four models to choose from—162 to *600* hp. Also, check the matched Michigan Tractor Scrapers—same basic power train design, same engines, same controls, 10½ to 29 yd capacities. Select the sizes you want to see, then call your Michigan Distributor for a no-obligation demonstration.

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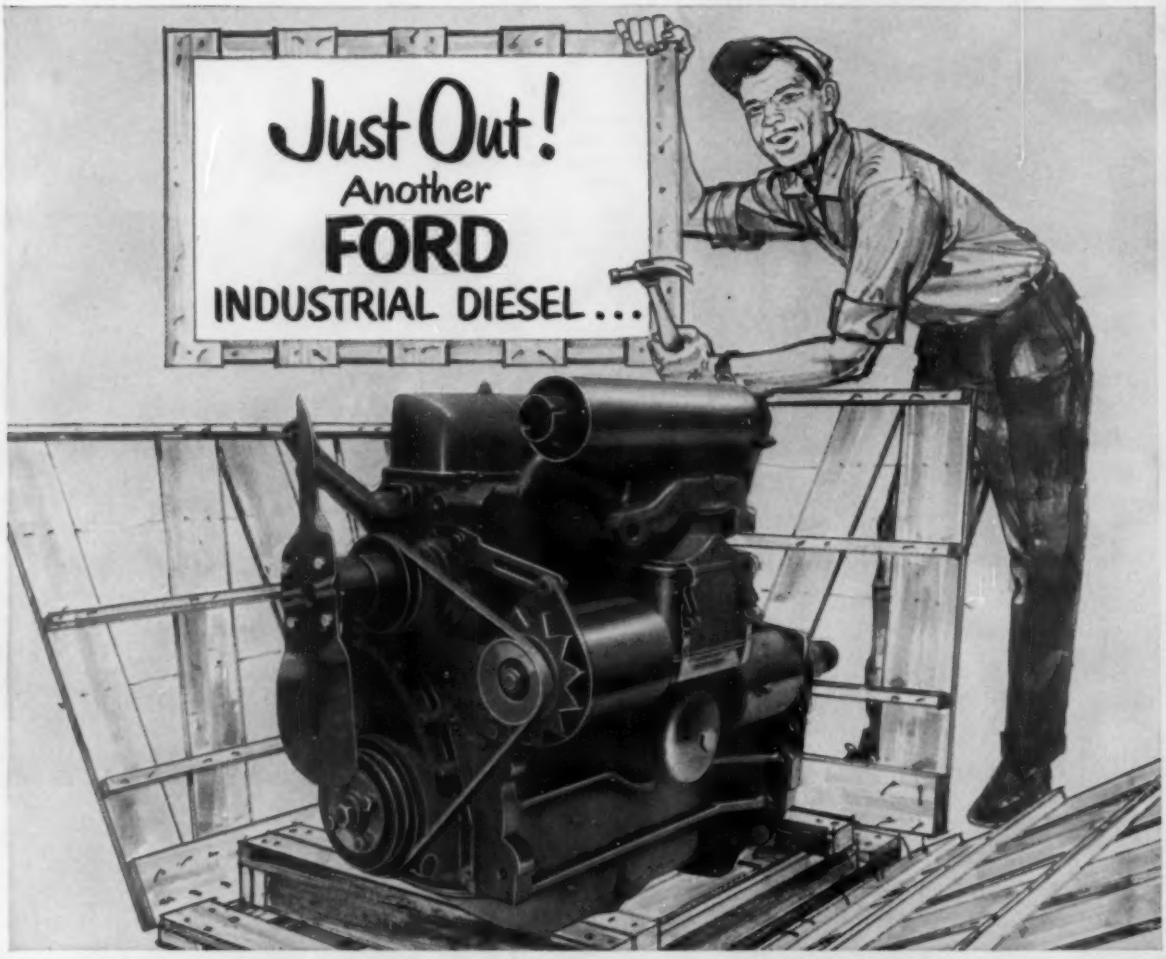

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To meet the growing demand for diesel power, Ford now offers a choice of three economical diesels—the highly efficient 172-, 220- and 330-cubic inch models.

Whichever you select, you'll be getting a completely modern diesel that delivers the high torque necessary to handle tough jobs with outstanding operating economy and easy, low-cost maintenance.

Ford Diesels also offer dependable 12-volt electrical systems for quick starting . . . replaceable cylinder sleeves that eliminate costly reboring . . . and rotating exhaust valves for better seating, longer valve life.

What's more, Ford's 172 Diesel and 172 Gasoline engines are *interchangeable* in your equipment. Many *parts*, too, are interchangeable between these engines. And low-cost Ford parts and service are always available at any nearby Ford Power or Tractor Dealer.

For greater productivity and more profit in the long run, it will pay you to check the 172 model or other Ford Diesels at your Ford Industrial Products Headquarters.

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ENGINE SERIES		172 FOUR DIESEL	220 FOUR DIESEL	330 SIX DIESEL
Basic Model		DD	X	Y
Type		4-Cyl. O.H. Valve	4-Cyl. Diesel	6-Cyl. Diesel
Bore and Stroke—Inches		3.9 x 3.6	3.94 x 4.52	3.94 x 4.52
Displacement—Cubic Inches		172	220	330
Brake Horsepower	Dynamometer	59 @ 2400	80 @ 2250	96 @ 2250
	80% Dyn. BHP	47 @ 2400	48 @ 2250	77 @ 2250
Torque	Dynamometer	140# @ 1200	151# @ 1600	236# @ 1600
	80% Dyn. BHP	112# @ 1200	121# @ 1600	189# @ 1600
Compression Ratio		16.5 to 1	16 to 1	16 to 1

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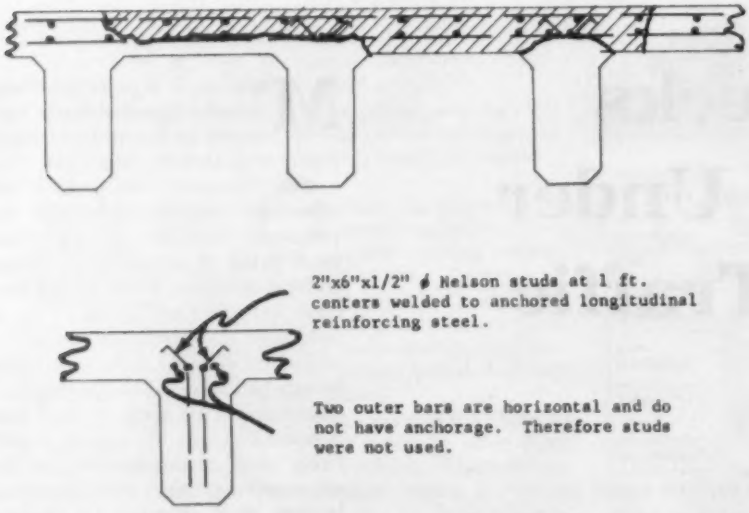
One of the more extensive repair areas, showing over-deck form supports in place and "high-early" being placed under single-file traffic.

Bridge Decks Repaired Under Express Traffic

Major deck repairs involving novel suspended forms were made in the midst of heavy traffic near Detroit, Michigan.

The structures are part of the suburban Detroit Industrial Expressway, built in the early war years prior to adoption of air-entrained concrete. Some of the concrete apparently wasn't up to peacetime standards; in any event, action of de-icing salts and other factors had resulted in spalling and deterioration of areas of deck and T-beam concrete. As part of a widening and modernization of the expressway, several twin overpass bridges were repaired by maintenance forces of the Wayne County Road Commission.

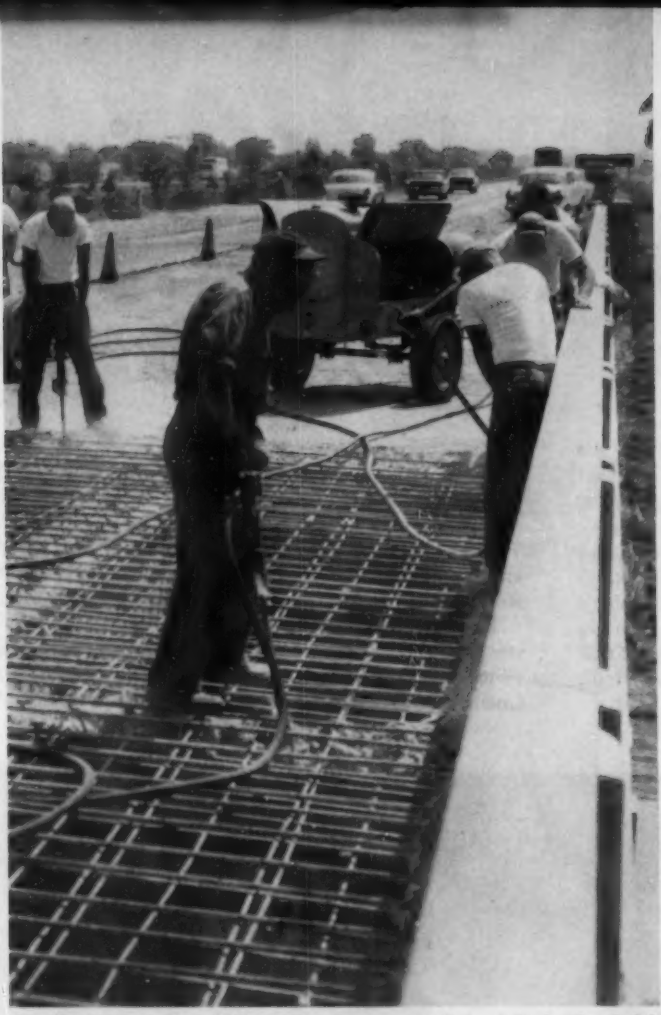
Showing how the form suspension bolts were carried up through a grid of walers and cross beams. Prepared patch area shown in foreground.


2"x6"x1/2" ϕ Nelson studs at 1 ft. centers welded to anchored longitudinal reinforcing steel.
Two outer bars are horizontal and do not have anchorage. Therefore studs were not used.

Typical details of a repair area, showing how shear stud bolts were welded to top beam steel where such steel was exposed.

The first step was to make a thorough inspection of the bridges. Areas of suspicious looking deck were marked off, but no attempt was made to delineate the exact extent of concrete removal. Rather, this was left to inspection as the jackhammer crews progressed.

A progression of crews was used, developed for such work by the road commission. Typically the lead crew consisted of about 8 men with two air compressors, 6 pavement breakers, occasionally an end loader and two dump trucks. This crew removed the bituminous concrete wearing course and the bulk of the deteriorated concrete. Then a clean-up crew removed all remaining pockets of inferior concrete, trimmed the edges of the patches, formed the underside of the deck where necessary, and welded the



Another major area which required removal of the full depth of slab between T-girders and trimming down of girders below compressive reinforcement.

One of the various standard and special traffic warning and directing signs used in the safety plan for the bridge repairs.

shear studs. This crew was sometimes aided by a third crew in making the pours and handling forms.

Flagmen were also included, although their work was lessened by utilization of carefully planned pedestal-mounted or mobile traffic control units. The bridges were repaired, one-half deck at a time, without the necessity of diverting traffic entirely from either of the dual express roadways. Single-file traffic was necessary at times.

The adjacent pavement widening, done by contract along the Detroit Industrial Expressway in the same program, consisted of adding a third traffic lane on either roadway. The bridge decks had been constructed three lanes wide back in 1940 with this ultimate widening in mind.

Maintaining traffic on the underpass roadway below also was a requirement. For this reason, and as an economy, falsework was dispensed with in replacing areas of deck that were cut out by the exploring jackhammers.

The pavement breaker operators began at spall points and kept going, deepening and widening carefully so as not to take out any sound concrete. Usually it wasn't necessary to go below the distributed reinforcement of the pavement. Much concrete was found that was extremely hard. Where the cutting was deeper but less than about half the slab depth, the slab was not drilled clear through. When it seemed advisable to make a complete removal, the edges of the hole were trimmed but left with a rough surface to aid bonding with the new concrete. It was at these cut-through places that forms had to be placed.

As an aid in re-establishing shear bond with new slab areas, ¾" x 4" shear stud bolts were welded to the inner lines of top T-beam reinforcing steel where this steel was exposed (see sketch). These were on 1-ft. centers. The areas to be concreted were swept clean of loose particles and dust, washed, and coated with neat cement just prior to placing concrete.

The forms while relatively novel were simple. Forms for the underside of the slab were held in position with form bolts. The bolts extended up through the gaps in the deck and through lines of paired 2 x 8 walers. The walers were supported on 8 x 8 or heavier timbers, blocked up off of undisturbed pave-

Continued on page 138

"'Live track' power steering rock...SO WE KEEP OUR TD-25

—Asheville Contracting Company,

Shale and blue granite rock make up 85% of the 550,000-cu. yd. of roadway excavation on this contract —5.18 miles of Blue Ridge Parkway construction, for the United States Department of Interior.

That's why Asheville Contracting Company places maximum reliance on their "rock-movers' special": king-sized International crawler power! Where the going's too tough or job progress is too slow and costly with big clutch-steered crawlers, "Asheville's" new 230-hp TD-25 and two veteran TD-24's take over—and "run interference."

"International 'live track' power steering moves more dirt and rock," states M. H. Reighard, Superintendent of rock operations for "Asheville." "Therefore, we keep our TD-25 and TD-24's on trail-blazing and pioneering. The 'live track' feature keeps the blade in the material and makes steep work safer. TD-25 balance enables working 'almost straight up' on mountainous terrain."

Exclusive, years'-proved International Planet Power-steering gives you full-time live power on both tracks to handle full loads on turns as well as straightaways. Load-limiting "dead-track drag" is eliminated. And

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"live track" power-steering is combined with on-the-go, Hi-Lo power-shifting that lets you match power to load instantly, for full-speed cycles. You do away with time-wasting "gear-shift lag!"

New TD-25 seven-roller tracks are strength-matched to the full effort of the high-torque, 230-hp turbo-charged Diesel engine! The "25" is platformed on shock-resistant, double-box-beam track frames—smoothly carried on International's dual-protected Dura-Rollers, the track rollers that make 1,000-hr. lube intervals practical!

As standard equipment at no extra cost, the TD-25 gives you exclusive, combined Planet Power-steering and Hi-Lo on-the-go power-shifting. And you get this work-speeding design advantage in torque-converter or direct drive model. Here, Asheville's "25" operator is ready to "shift-up" to keep the load on the move.

Power-steer and power-shift the TD-25 with king-sized loads—around curves, upgrade, anywhere! Compare planet-powered "25" ability to deliver full-load capacity, full-time—to outearn other big rigs up to 50%—blading rock, benching, push-loading, mass-production dozing (where fast reverse and decelerator action count), ripping shale! Let your International Construction Equipment Distributor demonstrate!

Even with an enormous offset load of shot-rock there's no "bank-nosing;" no sluing. The TD-25 operator simply operates the load-side track in high-speed range—the other track in low-speed range. Result: full-capacity, straight-ahead performance—the same as the "25" gives on benching, bank-cutting, or side-casting!

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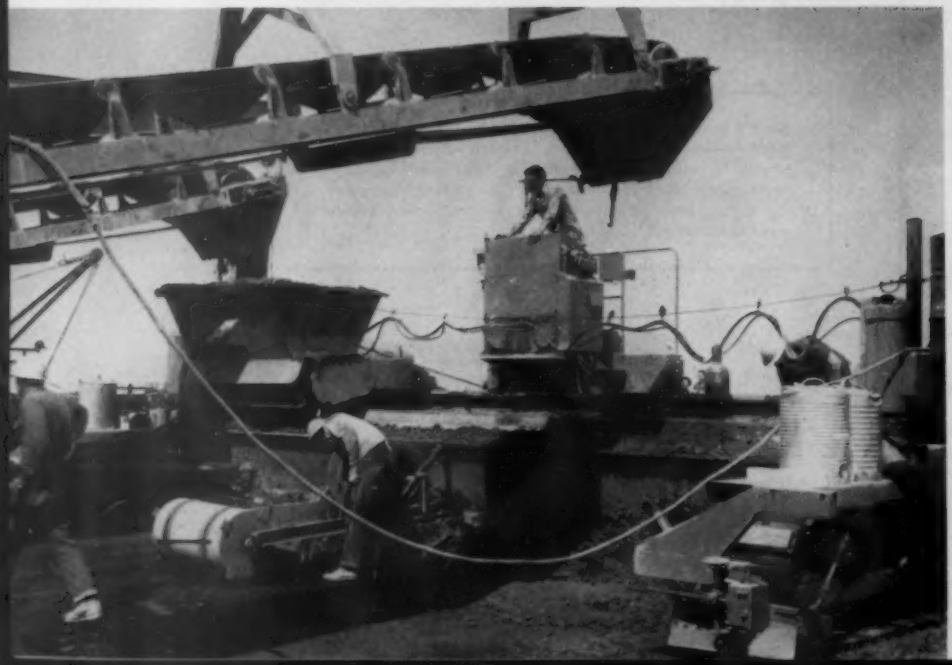
A COMPLETE POWER PACKAGE

Ball & Simpson, Gordon H. Ball Project

Pair of Koehring Twin-Batch pavers with special belt delivery, feeding a Guntert & Zimmerman slip-form paver on freeway project in San Jose, California.

Edgers leave the slab well formed as it emerges from the slip-forms. A Chevron float's diagonal wings seen at the right.



The Guntert & Zimmerman machine has a receiving hopper which alternately takes from each paving mixer belt and spreads concrete while moving transversely. Cylindrical device at left is for placing centerline tie-bars. Electronic sensing device for leveling and guiding, seen in right foreground.

SLIP-FORM PAVER

Continued from page 81

freeway projects on US 101 and sign route 17 in San Jose, requiring 35,000 cu. yd. of paving.

And in Los Angeles on a leg of Harbor Freeway, the joint venture combine, UPK Construction Co., of San Gabriel, and J. E. Haddock Ltd., of Pasadena, adopted the slip-form method for a 5-mile dual paving segment totaling 61,000 cu. yd.

These contracts to date add up to 208,000 cu. yd. or around 850,000 square yards of 8 and 9 in. concrete—substantial evidence indeed of the faith in the new method in this state.

The Harbor Freeway contract with the Haddock organization doing the paving is making use of a Rex (Chain Belt) slip-form paver. Traveling over a standard California cement treated subgrade, pavement is being produced to a smoothness well within the California state specification tolerance of 7 in. of roughness in a one-tenth mile section. This machine has regularly placed 2,000 cu. yd. or more per day of concrete 8 and 9 in. thick in 24-ft. pours for the 8-lane-divided project.

The paver is a crawler-mounted machine equipped with a 42-in. hydraulically controlled extrusion meter or strike-off back of a tamper bar, internal vibrators, a 24-in. oscillating belt, with a special chevron diagonal-blade float on the rear.

Hand finishing is done with two 14-ft. long-handled aluminum straight edges, a 4-ft. long-handled wood float for occasional supplemental use, plus usual edging, and a burlap drag on a rubber-tire mounted bridge. The curing spray machine also straddles the slab with rubber-tired wheels.

Concrete is supplied by a pair of Rex 34-E dual-drum paving mixers traveling one in the pouring lane and one on the shoulder. The 1 to 1½ in. slump mix specified with 4 percent entrained air is vibrated by a bank of 10 Maginniss variable-speed internal vibrators mounted immediately in back of the extrusion meter; the vibrators operate continuously when the paver is in motion.

Centerline tie bars are manually pushed into place at the prescribed spacing by a man stationed on the slip-form paver's front. Metal keyway forms are fed through a positioning slot along the paver frame. Outer tie bars are inserted manually as the key strips emerge behind the slip form.

The alignment is maintained by a stringline set on stakes along one side. Little trouble has been encountered in keeping the pavement edges accurately on course. The crew also speedily mastered the fine points of maintaining the exact slab depth. California allows no under-thickness and does not pay for over-thickness; hence the contractor's problem is to control thickness with the utmost accuracy at all times.

The job has been slowed by numerous bridges. Moving the two pavers, the slip-form machine and the curing machine has taken about the same time as for a standard outfit. Steel forms are set up for the first 30 ft. beyond each structure to help get started.

Concrete for this job is dry-batched in a Johnson plant using two Northwest No. 6 clamshell cranes, and hauled in Cook 5-batch and GMC 4-batch trucks.

According to Haddock's project superintendent, Henry Rollston, the slip-form paver is saving about 20 men as well as several machines and a set of forms. The paving crew (not counting the batch plant and truck drivers) has consisted of 2 paver dump men, 2 paver operators and 2 oilers, 1 slip form operator and 1 oiler, 2 laborers around the slip-form machine, 1 tie bar setter, 1 keyway setter, 4 finishers, 1 man on the curing applicator, 2 men on the joint sawing and sealing, and 1 superintendent—19 men in all. Ordinarily according to Rollston 20 men would be needed on the form crew and related work alone.

A few points of difference are noted from the engineer's standpoint. The cement treated subgrade, instead of being placed between the paving forms, 24 ft. wide, is constructed 26 ft. wide when the formless paving is to be used. Ordered by the engineer for structural reasons, this wider cement treatment is made economically feasible by use of the slip-form method. The engineers welcome this added width which gives greater support to the pavement edge.

New also for this job is the 1 to 1½ in. slump for the California Class B (5-yd.) paving mix. Reasonably careful slump control is considered desirable for insuring a good setup without forms. The slump for paving in California is ordinarily specified at not over 2 in.

Entrained air was used by these contractors to insure better workability, water retention and ability of the concrete to hold at edges.

Robert Innis is resident engineer for this project, under the state's Los Angeles District VIII.

Up in the Bay area, in San Jose, Gordon H. Ball and Ball & Simpson were at work during the 1960 spring months on their pair of freeway contracts, again using their Guntert & Zimmerman machine. This unit also travels on crawlers, striking off and finishing the slab and leaving it accurately shaped by trailing side forms that drag along the subgrade. This machine is similar to the one used by Griffith Company in their 1959 and more recent projects.

This machine utilizes a receiving hopper mounted on a transverse rail, the hopper laterally spreading and blending the batch from first one then the other of the two Koehring 34-E dual paving mixers. The 34-Es on this job travel side-by-side on the subgrade. They are standard except for the bucket rail which, for the job, is replaced by a belt conveyor designed to feed the slip-form hopper.

This slip-form unit has diagonal rear float blades as standard equipment. The unit is guided electronically both in line and grade by sensing units governed by piano wires strung along both sides.

Centerline tiebars are inserted using a drum device (see photo) which releases the bars into accurate position as paver moves forward.

Concrete for this job is dry batched in a Noble Triple Batcher portable plant and transported in Cook 6-compartment truck bodies.

H. E. Brown is superintendent for the Gordon H. Ball and Ball & Simpson work, with Andrew Anderson and Warren Smith resident engineers for the state, under the San Francisco District IV.

General Notes. Ball & Simpson et al, followed standard California procedures in processing the cement treated subgrade.

The company first spread the untreated base material, bringing the top to proper grade and cross-section. Then the upper four inches of this material (compacted thickness) was loosened and formed into two equal sized windrows alongside the roadbed. Cement in bulk was deposited in a notch in the top of each windrow (in conformance with California road-mix practice), the cement mixed in and water added using a roadmixer, and the material laid out and finished to accurate grade and cross-section again.

In the absence of paving forms for controlling the cement treatment's evenness, Ball & Simpson took certain customary pains (similar to those taken for such base when paving is to be asphalt concrete). Initial grading and windrowing were done with a motor grader operating to blue tops set from the engineer's control stakes. The control stakes were offset 3.71 ft., to conform exactly to the location of the control wire that was to guide the slip form. Stakes were at 50 ft. intervals, or 25 ft. on vertical curves.

A spreading device on the road mixer made the initial spread. Then came a tractor-towed spreader with automatic hydraulic controls for the final finishing.

During this operation the contractor's crewmen kept constant check on both the finished grade and the cross-slope. The finished subgrade was given the usual asphaltic curing seal, and was then ready for the paver base.

CORN COBS WERE PART of the mixture used recently in a demonstration grass seeding project in Mississippi.

Along Highway 51 near Batesville, a strip about 20 ft. wide and 300 ft. long was treated with a mixture of ground up corn cobs, asphalt and Bermuda grass seed.

The cob mixture was shot through a thin spray of asphalt, introduced to make the mixture hold together better on the ground and capture the warm of the Spring sun. About five tons of cobs were supplied by a local maker of corn meal. The application was made under the eye of Fred Marett, district maintenance engineer for the Mississippi state highway department.

During and after placing the topping on worn areas of the Brooklyn Bridge Approach. Rough broomed finish provided as a final step.

Special Topping for Spalled Bridge Approach

A quick-setting topping material was applied to a rough and hazardous section of road surface on the Brooklyn Bridge in New York City. The method reportedly saved the contractor two entire road-laying operations and considerable expense, compared with alternate repair schemes, while making it possible to open that section to traffic the morning following application.

The material used was Permatop, a protective hard-surfacing adhesive product which forms a durable bond with concrete surfaces and cures within eight hours.

The plastic-like material was placed ⅛ in. thick over a spalled area of several thousand square feet on the ramp approach to the Manhattan end. The job was completed in 6 hours, using only a surface trowel and a wooden screed.

The area covered had suffered from severe surface spalling and deterioration caused by freezing during cold-weather pouring of the original roadway in 1957.

The makers of Permatop claim that this overlayment becomes completely waterproof and weatherproof, being resistant to corrosion against oil, grease, salt, gasoline and a large number of chemicals often encountered in normal road wear. The only preparation, where the pavement structure is sound, is a clean, dry surface. The commercial resin base is mixed with a chemically treated aggregate and immediately applied.

After more than 1½ years of service, the new topping has been called a complete success. It shows no sign of wear other than a slight darkening of the surface, which of course could easily be attributed to the normal effects of heavy traffic. Slattery Contracting Co., Inc., had the bridge work contract.

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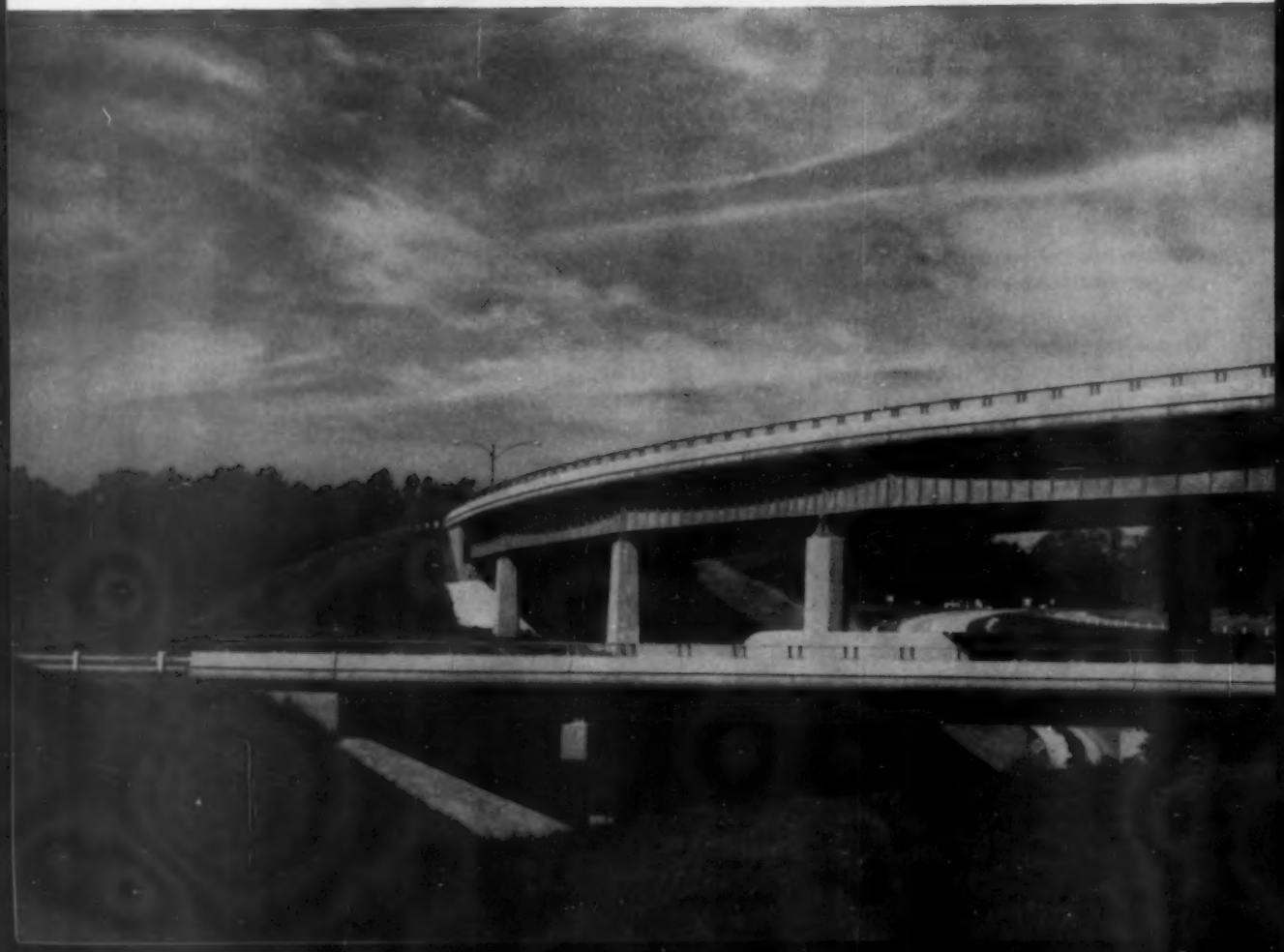

Since 1908, when the J. E. Greiner Company was founded, the firm has designed more than 100 large steel bridges and designed and supervised the design of about 900 short-span steel bridges for major turnpikes and expressways. According to Mr. Allen, Senior Partner, steel has always played an important part in their designs because of its economy, speed of erection and easy handling.

In recent years, the Greiner Company has designed a large number of short-span steel bridges for various sections of the Pennsylvania Turnpike, the Ohio Turnpike and the Indiana Toll Road. Speed of construction was important on all these projects and virtually every bridge design developed by the company utilizes steel construction.

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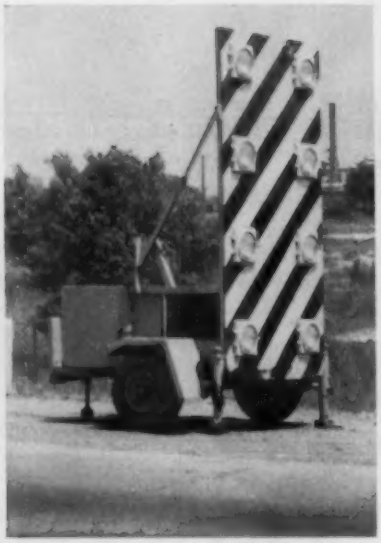
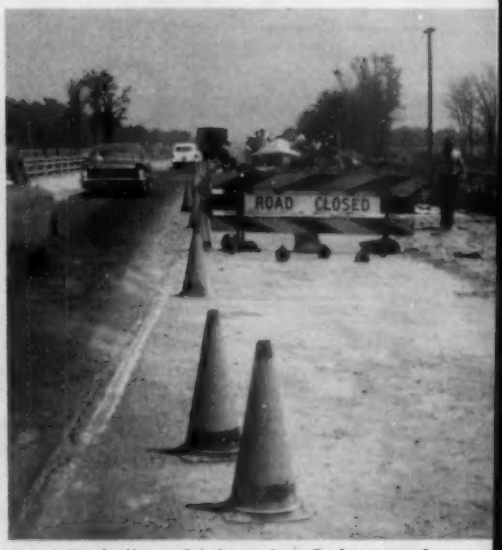
Patch area trimmed neatly, ready for the moving forms and pouring.



Two traffic lanes in use while workers prepare other side of deck.



Specially built multiple amber flasher panel, cart mounted, devised by Wayne County for controlling heavy traffic.

BRIDGE DECK REPAIR

Continued from page 129

ment areas so as to leave clear space for the concreting operation.

The waler and beam grid and other details were improvised by the experienced bridgemen as the work went along. Usually an entire half-deck of a two-span overpass would then be concreted in a single operation, using high-early-strength transit-mix. Curb and parapets were also patched or replaced where needed in the operation.

The repair work here described was performed in 1957. The renewal has shown every evidence of being highly permanent in the interval to date.

Not only the repair methods, but also the provisions for handling traffic of such work in the Detroit metropolitan area have been the subject of much interest. For the bridge repairs here pictured, since they were handled under a traffic volume of some 15,000 vehicles daily for each roadway, an explicit sequence of traffic control devices was made available. The plan was to provide 22 ft. of pavement width for traffic at all times, except during the brief periods when the transit mixers had to encroach on one of the two lanes to make their pours. Concrete pours were restricted to non-rush hours.

Signs were posted in depth to warn approaching traffic of repairs ahead, of left or right lane closure ahead, etc. A feature was the use of specially built rubber-tire-mounted towed signs, fitted out "like a Christmas tree" with generator operated amber flashing lights. This type of sign, towering some 12 ft. in the air, with its bold striping, proved effective in forcibly alerting oncoming drivers to slow down and proceed with caution. These units were usually stationed on the shoulder well in advance of the job site.

The repair work was done under the immediate direction of R. D. Merriam, then the county's bridge maintenance superintendent and now engineer of structures and expressways. Joseph W. Gross is county highway engineer of the Wayne County Road Commission.

Oklahoma Department Gets Major Overhaul

A major realignment and shuffle of personnel have been announced by the Oklahoma highway department of which Lee B. Washbourne is director. J. D. Powell is assigned to the new position of assistant chief engineer; Roland A. Walters, Jr., as chief counsel of the new right-of-way and legal departments; Robert V. Jones as chief administrative assistant in charge of the new administrative division.

Newly created are a number of staff divisions at headquarters including information service, design, planning, bridges, materials tests, survey, maintenance and construction.

A number of functions such as that of the urban engineer, the federal aid engineer, the farm-to-market engineer and others have been realigned into various departments. The headquarters division now number eight involving engineering functions and three administrative.

Michigan Letting Schedules

MICHIGAN'S contract letting scheduled for April 27 offered the second-largest dollar volume of road contracts of any letting in U. S. highway history, and the largest ever in Michigan. The $28.3 million of offerings, plus the state's April 6 letting, totals 80 miles of work. This exceeds the entire awards for typical years prior to the present expanded federal-aid program.

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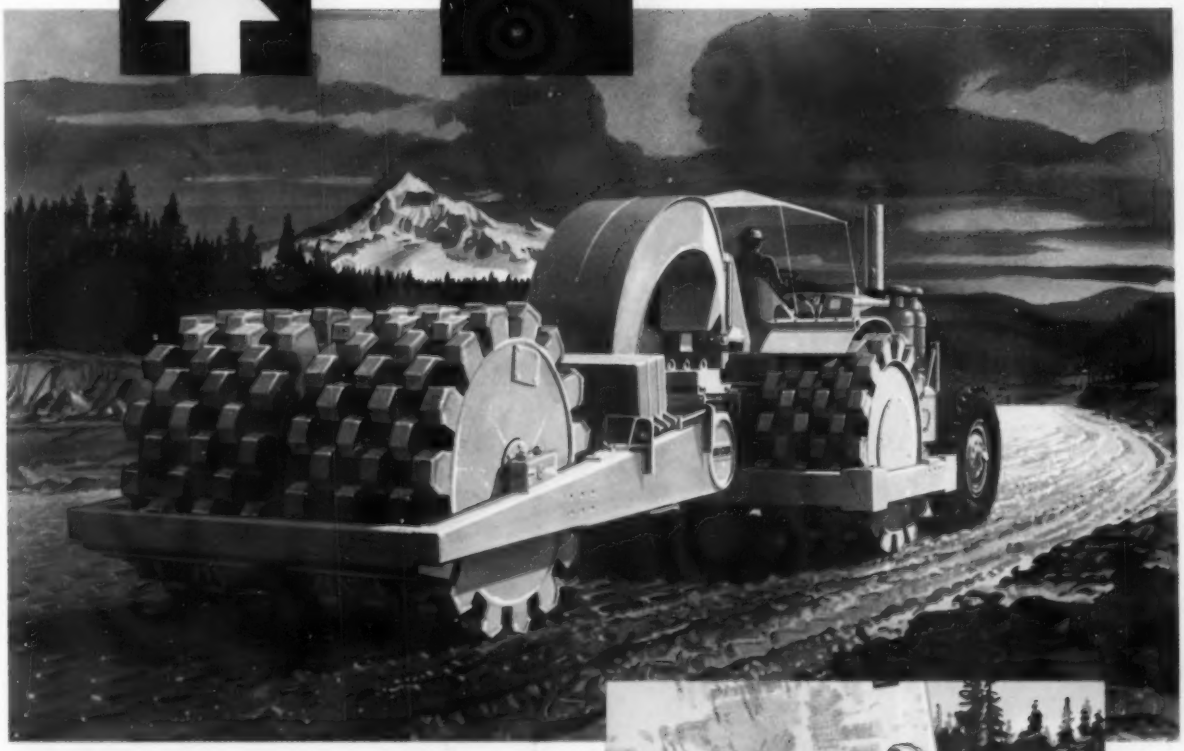

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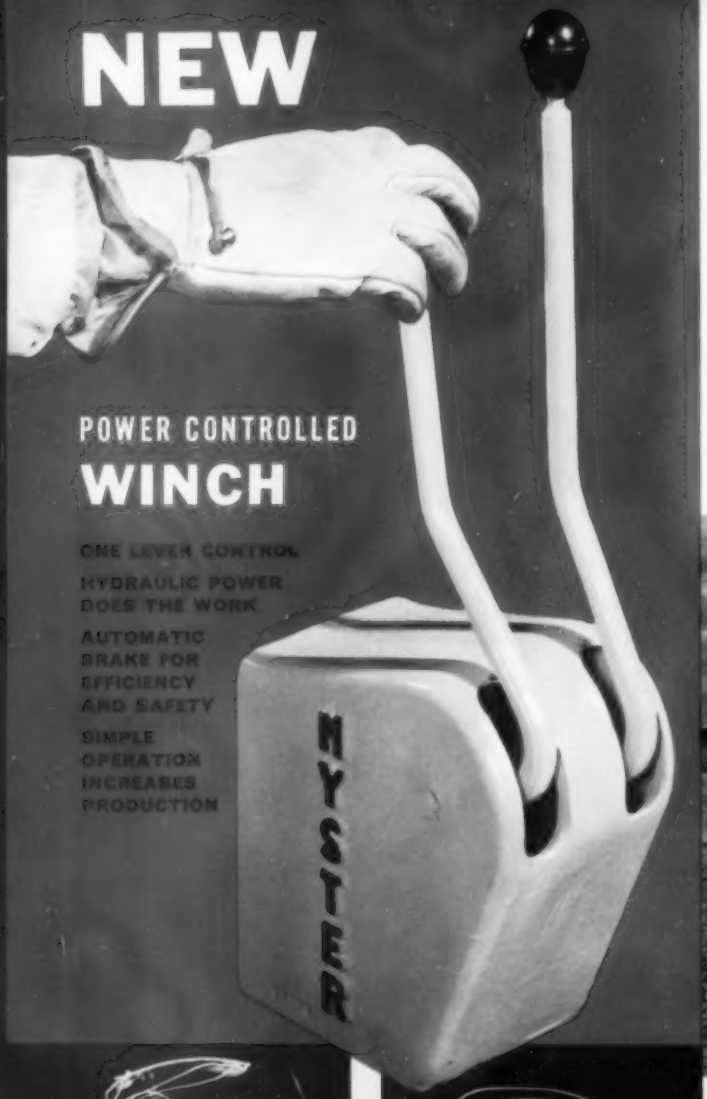

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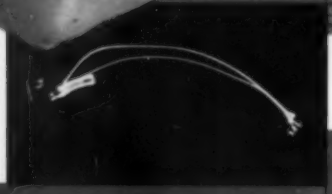
Complex motions required to operate conventional mechanical controls are shown by light trace of operator's hand movements.



Simple hand movements required to operate Power Controlled Winch are illustrated by light trace pattern above.

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DW20A Tamping Compacter rolls highway embankment.

Model D Tamping Roller compacts base course.

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Model D "Grid" Roller crushes pit-run river rock.

Model D "Grid" Roller compacts highway embankment.

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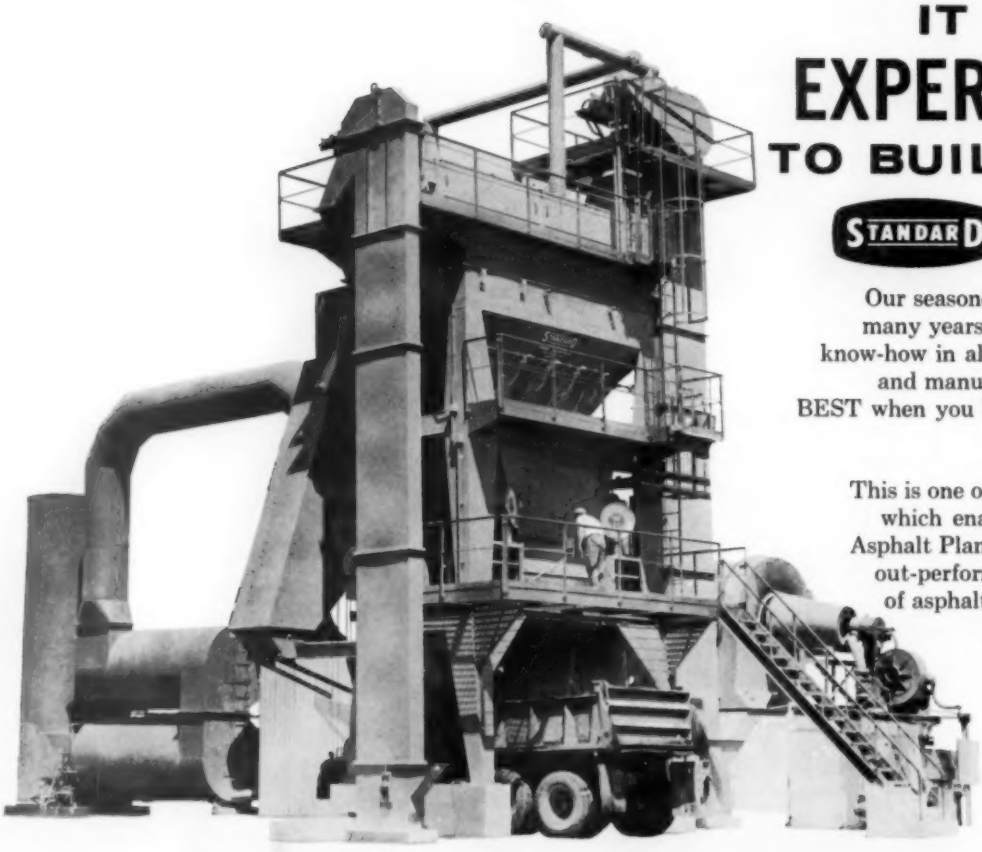

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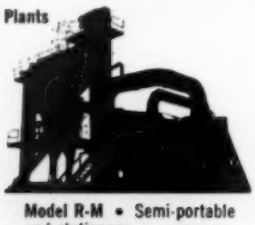

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The Private Consulting Engineer and the Road Program

By John Clarkeson
President,
The Clarkeson Engineering Company, Inc.

There has recently been a wave of criticism in the press, in legislative councils and in administrative circles of the use of the privately employed engineer in public works, at both the Federal and State level.

Public document 424 of the U.S. Senate Committee for Public Works of the last Congress questions the continued use of A and E contracts for the massive federal programs and recommends that the present Congress investigate this use of private enterprise.

In the House of Representatives, two committees are delving into the cost of the federally aided highway program. From some of the statements coming out of Washington and from the statements made to Congress by its General Accounting Office, the ills of the highway program are being charged to a sizeable degree on the use of privately employed professional engineers. Two voluminous documents issued in August and December of 1959 by the Comptroller General to Congress are severe criticisms of the entire private enterprise system, though pointed more directly at the engineering profession.

This forthright rebuttal to recent public criticism of the private consultant's role in highway and public works programs is based upon a presentation made at a joint meeting of the St. Lawrence County Sections of the American Society of Civil Engineers and the New York State Society of Professional Engineers, Potsdam, New York, January 26, 1960.

At the Executive level the White House committee headed by General Bragdon has made some very harsh statements regarding the use of consulting engineers on the highway program.

At the New York State legislative level, a Senate committee has made a report, not as yet publicly released, which makes some very caustic remarks.

All of this, by inference and innuendo, creates the atmosphere that the use of private enterprise in the engineering field was costly, unprofessional, and not in the public interest, nor in the interest of economy in the advancement of this and the other public works programs.

Some is based solely on the inhibition that the use of consultants as a part of the team with private contractors, materials men, equipment manufacturers and public officials upsets the "time honored" civil service employment of civil engineers in these fields.

Fortunately or unfortunately, as you wish to view it, facts, if any, when presented are less than the whole truth by quite a margin. Federal agencies which are supposed to present a full pro and con report to their superiors report only one side, with no evaluation of the other.

I always was taught that engineering evaluation requires a fairly clear and complete evaluation of various methods to solve a problem, whether structural, functional or administrative. Also, I was taught that auditors and others in the evaluation business were so bound professionally.

We seem, however, to be in an era where many

engineers and auditors in important public positions no longer feel that clear evaluation is necessary. All that seems necessary is to present one small side of the problem, kill the other side with gossip or cliches, and hope that—with the support of the press and other channels of propaganda—the other side of the story will not come out to permit intelligent determination of public policy.

That is where we are today. At the hearings by these various committees this year, there will be presented the most biased picture as far as the engineering profession is concerned, unless you as engineers insist on the full story being shown.

Many of you perhaps do not know it, but the private consulting engineer has always been in a major position in the highway field. Although many insist that our use is a break with tradition, this is not true. All during the 19th and early 20th century, streets and highways were laid out by private civil engineers. The first state highway department was not founded until 1891 in New Jersey. By this time many thousands of miles of roads had been laid out and constructed throughout the nation.

Nor did the work of private engineers cease. Although by the early 20's most states had formed highway departments, a great many counties, cities and towns, and even the federal government, recognized the efficiency of contract engineering.

On modern state highways and parkways they have been actively employed as a team with state highway engineers since the mid 30's, when Robert Moses found it necessary to aggressively use them for the extensive parkway system in and around New York City. As a matter of fact, in dollar volume, private consultants have designed more highway value than all the highway departments put together. Just since the 30's, more than half the dollar of expressway, modern highways, bridges, tunnels, etc. that have been built were privately engineered.

This is effective team work—the private engineer working under the direction and planning of public agencies.

Measuring Effectiveness

I usually consider the effectiveness of engineering to be measured as follows:

1. Producing a facility to serve its function effectively with the least waste of construction manpower and materials.

2. Producing a design which, when under construction, results in the fewest design changes, overruns in costs and other construction changes.

3. Producing these things at the lowest cost in engineering dollars and time.

On these three counts have the private consultants been most effective.

Regarding the first. It is always a hard thing to measure overdesign. Under-design shows up either in structural failure or in congestion, or lack of solving the problem; that is, too little of what is needed. Over-design does not too often show up, and arguments on this front are numerous. In practically all of the work with which we have been engaged in the last 10 years, I have found myself arguing for the lower-cost facility. This in over $500 million worth of facilities. I have not usually won those arguments. Nor can I state that I've always been right. In conferring with other private engineers I've run into the same pattern in their experience. This seems to be more true than not in consulting engineers' experience.

In spite of this, however, the Comptroller General of the United States, after reviewing the use of consultants on the highway program, in effect accuses the consultants of over-design to build up their fees. In spite, again, of this printed accusation to Congress, the Associate Director of the section which prepared that report stated in writing to me as follows:

"With regard to instances where consultants may draw more elaborate plans than were required in order to increase their fees, I stated to you that we had no knowledge of any such instances. We would not normally undertake to find out such instances, because any such determination would require evaluation of the engineering aspects of the projects, which we do not consider to be within the area of our audit responsibilities or technical competence."

This, from the man who prepared the report stating we were overdesigning.

I believe in this case we are not over-designing. The lack of failures on highway and other construction prepared by private consultants answer the possibility of under-design.

I guess we measure up on that score.

Excessive Design Changes

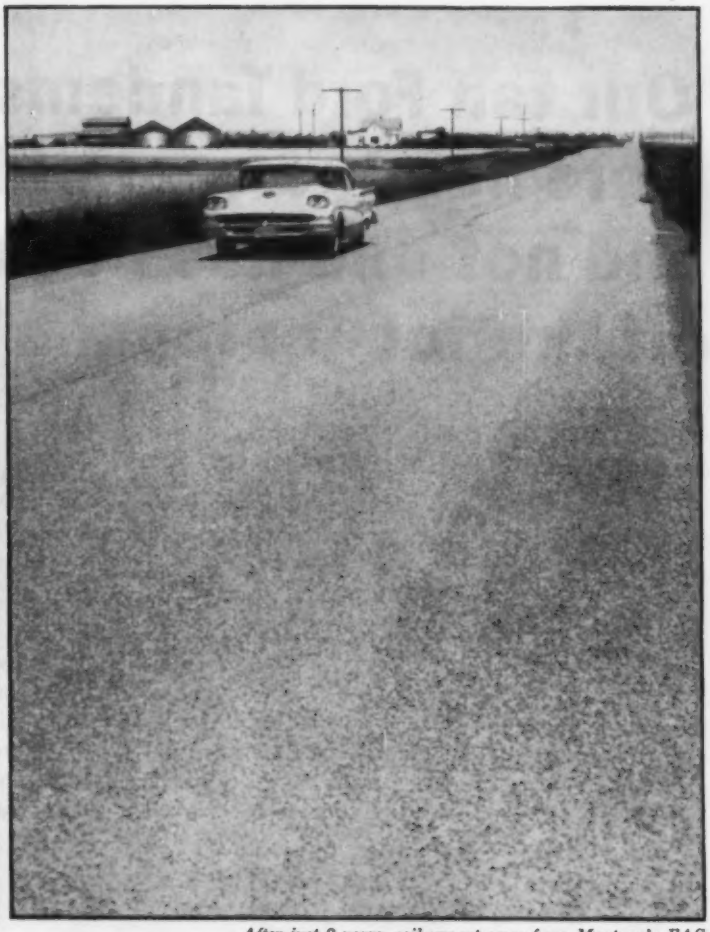
In regard to excessive design changes, overruns in quantities or similar design deficiencies, I believe the record will show, if anything, that the consultant has done better than his civil service counterpart. This record would have to be extracted. At one time when I was an employee of the Bureau of Public Roads this was a matter which came over my desk. Most of the work then was by publicly-employed personnel. I have a vivid recollection of design changes and overruns on contracts and the explanations given therefor. In the work I've been attached to, both in the design phase and in the construction phase, I would say the consultant does at least as good a job. An extraction from the records would be necessary to properly evaluate this.

In the matter of overruns in time, it is in the interest of consultants engaged on inspection work to see that a job is finished on time. Normally, he is paid too little or not at all to cover

Continued on page 148

Scientific research
on soil-cement
pays off in Montana

Scientific research is aided by modern coring methods.



After just 2 years, soil-cement cores from Montana's FAS Route, Rudyard south, tested 1,293 psi. 7% cement was used.

Soil-cement gives the strongest low-cost pavement there is!

Years of laboratory testing and evaluating, plus experience on more than 12,000 miles of roads, make today's soil-cement the scientific, precision-built pavement for low-cost roads in every climate.

Soil-cement has dependable strength right from the start—actually grows stronger year by year. It's stronger inch for inch than any other paving material short of concrete. And its beam strength spreads the load over the subgrade. You can forget potholes, washboards, costly upkeep.

Research shows you can use almost any kind of soil. Rubble and old road surfacing can be mixed right in. Laboratory procedures have established how much—or how little—portland cement to add. That's why first costs are so low. Up to 75% of your materials are free!

Add a thin bituminous topping—you've got a low-cost road good for many years. Soil-cement is the scientific answer for low-cost roads—streets, shoulders, airports and parking lots, too. Write for free information. (U.S. and Canada only.)

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MODERN
soil-cement

"Our ten Ford Tandems are nearly a year old and not one has been off the job for repairs"

SAYS ALBERT HOEFFKEN, PRESIDENT
HOEFFKEN BROS., INC., BELLEVILLE, ILLINOIS

"We have been in the grading and paving business since the turn of the century and have used Ford Trucks since the Model T days. Our experience has proved that Fords are economical to operate and the easiest to keep on the job. All repairing is done in our shop so we can tell which trucks are the best for us.

"Our schedules make it impractical to assign a driver to a particular truck and it's not unusual for one unit to have as many as 20 different drivers. This is one of the big reasons we ordered Transmatic Drives on our most recent Ford Tandems. These ten T-800's are nearly a year old and not one has been off the job for repairs.

"Ford's '332' V-8 gives us the power and performance we need for efficient batch concrete hauling. Our Tandems with Dumpcrete bodies carry nearly 6 cu. yd. per trip. And, even in mud up to the axles, they get the loads through. Another thing we like about Ford Trucks is the fact that Ford parts are less costly to buy and much easier to obtain than parts of other well-known truck manufacturers."

FORD TRUCKS COST LESS

LESS TO OWN . . . LESS TO RUN . . .
BUILT TO LAST LONGER, TOO!

Now at your Ford Dealer's

FORD Falcon RANCHERO

America's lowest-priced* pickup truck!

The Falcon Ranchero is priced lower than any pickup in America with comparable standard equipment! And that is just the beginning of your savings. Single-unit construction saves on maintenance . . . it's tighter, quieter, with main underbody structural members zinc-coated against rust and corrosion. Front fenders bolt on, cost less to replace. And Ranchero's passenger-car ride and handling ease lessen driver fatigue.

UP TO 30 MPG!

Totally new for *total* savings! Ford's new Falcon Ranchero delivers up to 30 miles on a gallon, yet its new 90-hp Six is geared to do a real job! There's lower costs for oil, tires, brakes, replacement parts . . . nearly everything!

BIG 6-FOOT BOX!

Capacity is more than ample for most pickup hauls—nearly 8 feet of load length with tailgate flat. And thanks to the low floor height, loading and unloading is faster, easier!

FEATURES:

1. Up to 30 miles on a single gallon
2. 4,000 miles between oil changes
3. Diamond Lustre Finish needs no waxing
4. Low loading height
5. Instant-lock tailgate opens, closes with a single, one-hand motion
6. Roomy comfort for three adults
7. Styled to capture admiration

*Based on a comparison of latest available manufacturers' suggested retail delivered prices with comparable standard equipment

See the parade of pickups during your FORD DEALER'S TRADING FAIR

Hoeffken's T-800 Fords, with Dumpcrete bodies, are real all-purpose trucks. They can carry up to 14 tons of crushed rock or 5.7 cubic yards of batch concrete.

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PRIVATE CONSULTING ENGINEER

Continued from page 144

inspection when contracts go overtime. His best interest is served by completing on time. This is not true of the government employee, who takes no risk of loss on an overtime situation.

Recent accusations by the press on the quality of inspection work are, of course, unfortunate. We are all human and fail in most human characteristics whether employed privately or publicly. By the same token, there are devoted employees on both the public and private payrolls. However, having made construction and maintenance inspections on both accounts, I do not believe there have been as many structural or other failures of work inspected by private engineers as by public engineers, either in total or in proportion to the work performed. I can only speak here from experience. Again a good extract from the record would easily pin this down.

One-Sided Publicity

Let's look, however, at the picture as presented by the Federal Government. That governmental arm, through its General Accounting Office and other agencies, seems most vociferous in its criticism of the use of private engineers.

The Federal Government is the third largest highway department in the country. That is, aside from its Federal-aid functions, it acts as its own highway department in forests, parks, territories, foreign road work, etc. In these fields it performs the planning, design, contracting, and inspection function normally associated with State Highway departments.

The Claims Division of the U.S. Department of Commerce has continually had to make very heavy awards to contractors for poor design and planning, and poor inspection and layout management by these people. While state highway departments have generally, with or without consultants, been able to complete its work within 10 percent of the contract bid, overruns of 100 percent by the Federal Government by federally designed and managed work are not unusual. A very careful review of this work both within the state, in Central America and in other foreign assignments should be made.

What About Fees?

As to fees paid consultants: The rate of fees presently paid to consultants for the design and inspection of public works, both highways and other, are about half of the costs incurred by those agencies when performed by themselves.

The annual report of the California highway department, which uses no contract engineers, shows a cost of 16 percent of the cost of construction, exclusive of overhead and research. The Hoover Commission Task force for Real Property Management shows that when the Federal Government does its own design and inspection work, work costs over 17 percent exclusive of overhead, planning, budgeting and research. That task force found that, for those Federal agencies which did use the contract engineering method, costs around 7 percent were encountered. This is not based upon small occasional projects, but upon approximately $900 million worth of design and inspection work.

One eastern state has asserted to the Bureau of Public Roads that its construction inspection work costs 6.3 percent of the cost of construction. The Bureau's audit establishes only 5.3 percent as the correct amount when performed by its, the highway department's, engineers. This same state is getting this same work done for 3.5 percent by consultants.

Another eastern state accuses the Bureau of short-changing it on construction inspections by its own employees for allowing it only 5 per cent of the cost of construction. It claims it costs 6.6 percent. I know of no consultant receiving these amounts in any state.

The General Accounting Office in December "accused" the Pennsylvania Highway Department of spending $12 million per year for consultant's plans and designs. It does not say what this would cost if done by the department, but infers that the entire sum would not have been spent if consultants were not used. I don't know how naive the GAO must be. The Comptroller General who heads this federal agency must have forgotten that he is required to review all federal expenditures, whether to consultants or not. I know that they review final vouchers for engineering work done by state and federal forces. If he found consultants to be more expensive than force account engineering, why didn't he say so? Why didn't he admit that he knew the costs of each method?

Confused Federal Policy

I personally am completely confused as to what public policy is. When President Eisenhower was running for his job, he deplored the great number of persons on the public payroll. He seemed wholeheartedly in support of private enterprise whenever the public could be equally or better served by private agencies. As late as May 14, 1959, when he was the guest speaker in New York for the celebration of the advancement of science and engineering, he said: "We must recognize the possibility that the Federal Government, with its vast resources and its increasing dependence on science, could largely pre-empt the field or blunt private initiative and individual opportunity. This we must never permit."

In discussions with Secretary of Commerce Lewis Strauss and his successor, Secretary of Commerce Mueller, we were advised that, on engineering, surveying and similar work in connection with the highway and other public works program, the Federal policy was completely for the use of private engineering organizations. Yet the Federal Highway Administrator and his staff have unrelentlessly pressured the states to divest themselves of private enterprise in the engineering field. To deny this would be to deny the thousands of letters in state

Continued on page 150

NEW HAMPSHIRE—L. M. Pike and Sons of Laconia recently paved 2 miles of Route 302 west of Wells River, Vermont. Their Huber-Warco Maintainer was used to blade the rebuilt shoulders prior to a two course surface treatment of the shoulders.

HUBER W WARCO

HUBER-WARCO *maintainers*

"Nine Machines In One"

VERSATILITY and year 'round performance are two important benefits of a Huber-Warco Maintainer. The basic machine has a nine-foot power sliding moldboard for routine grading work. Hydraulic controlled attachments quickly convert the Maintainer for service as Bulldozer, Lift-Loader, Scarifier, Berm Leveler, Side Dozer, Broom, Patch Roller and Snow Plow.

TORQUE CONVERTER combined with 45½ H.P. gasoline engine gives plenty of power for toughest jobs. Converter reduces shock loads, prolongs machine life, increases work capacity and cuts fuel consumption.

WORKING SPEEDS range from 1.7 to 8 M.P.H. Travel speed is 21 M.P.H. for quick movement between jobs. Weight is 6,250 lbs.—7,205 lbs. with calcium chloride in tires.
A complete line of optional equipment, in addition to the hydraulic attachments, is available for the Maintainer.

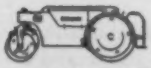
A trusted product name backed by respected distributor names from coast to coast

MOTOR GRADERS

Standard transmission models from 83 to 160 H.P. Torque converter and power shift transmission models from 102 to 195 H.P.

TANDEM ROLLERS

3-5 Ton • 4-6 Ton Retractable • 5-8 Ton • 8-10 Ton • 8-12 Ton • 10-14 Ton



3-WHEEL ROLLERS

10-Ton • 12-Ton • 14-Ton Standard Weight 10-12 Ton • 12-14 Ton Variable Weight

MAINTAINER

M-52 — 45½ H.P. Attachments are Lift-Loader, Broom, Bulldozer, Patch Roller, Scarifier, Snow Plow, Berm Leveler

HUBER-WARCO COMPANY **Marion, Ohio, U.S.A.**

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PRIVATE CONSULTING ENGINEER

Continued from page 148

department files urging this procedure.

What should be done about it?

When Federal and State officials continuously tell our consumers that they should no longer buy our services or products, the engineering profession itself has not come forward to answer the charges or lay the facts on the table. If the present hearings in Congress are allowed to be defaulted by the professional engineer, he will have himself only to blame for the complete drying up of his profession.

The Functional Division of the National Society of Professional Engineers has requested information for them to carry on their fight in this matter. The Consulting Engineers Council is now preparing to request of its members funds to prepare and present the full picture to Congress this year. The American Institute of Consulting Engineers is requesting its members to fight this situation so that clear and uncontestable facts are present.

Fortunately, other associations with your interest at heart will also attempt to clarify the facts on this matter. The Engineering Division of the American Road Builders Association, and the American Society of Civil Engineers, to the extent that they can represent the engineer in private practice, are prepared to present your case.

But they must all have your support. In funds, yes, and in interest and action. You must support these agencies this year or the loss to you in the years to come will be irretrievable.

You and your employees can, by writing to your Congressman, state senators and assemblymen, show them that this is a matter of considerable concern to their constituencies.

This must be done if the private enterprise system is to be protected and if the public is to be served by good economical engineering methods.

Cold Weather Helps Maine Road Work

Cold weather normally hinders field construction and introduces the need for design features that would not be required in warmer climates. So notes a bulletin of Fay Spofford & Thorndike, Inc., consulting engineers of Boston, in regard to road work in Maine, where construction is currently in progress on a new interstate route from Portland to Yarmouth. "True, the design presumes that there will be a minimum of 35 in. of frost below the surface, and that once every five years it may penetrate below this level", said the bulletin. "But in certain areas containing large amounts of marine blue clay, cold weather has *aided* both the field staff and the contractors.

"During the normal construction season, water may infiltrate through fine sand strata and soften the clay. When this occurs, it is impossible to operate excavating scrapers. Sometimes tractors and power shovels must be worked on mats.

"Frost alleviates such conditions considerably. In clay cuts for example, it has enabled the field crew to cut away the surface to subgrades and install drains without much difficulty. The frozen crust has supported trucks carrying borrow and base materials across areas that in warmer weather would be impassable.

"By spring," concluded the bulletin, "the field engineers hope that the natural plus artificial drainage will result in a clay surface in the cuts relatively free of water and firm enough to carry the base and pavement. Until then, the lower the mercury the easier the work."

KEEPING DOWN-TIME DOWN

Continued from page 91

specification of 95 percent standard AASHO density. The Buffalo-Springfield Kompactors have performed most of the rolling. Rolling is done systematically working across the fill from one side to the other in the axis of the job. The Talbotts found that a combination of one dual-drum sheepsfoot roller working with one or two Kompactors secured the required density with fewest passes. Skillful laying out with a motor grader aided in keeping roller time to a minimum.

The Kompactors with their segment shoes helped keep the fills well sealed. With their use, plus the practice of dragging dozer blades and giving fills a crown and final dressing with the motor grader at day's end, the fills were well protected against moisture infiltration during rains. The company credits this combination for earlier "go ahead" by the state inspector after rains.

The season's good yardage here gets back to the Talbott philosophy of equipment care. There was nothing fancy about the setup—just a well equipped service rig for each of the two projects. One was a Ford and one a GMC truck carrying Alemite hose reels, pressure tanks, compressor, and hand grease guns for dispensing the assorted grades of lubricants needed. Standard oil lubricants have been used with close cooperation of the suppliers.

Each of the service rigs is manned by a driver and a service man, both of whom are good mechanical men hand-picked for this important work.

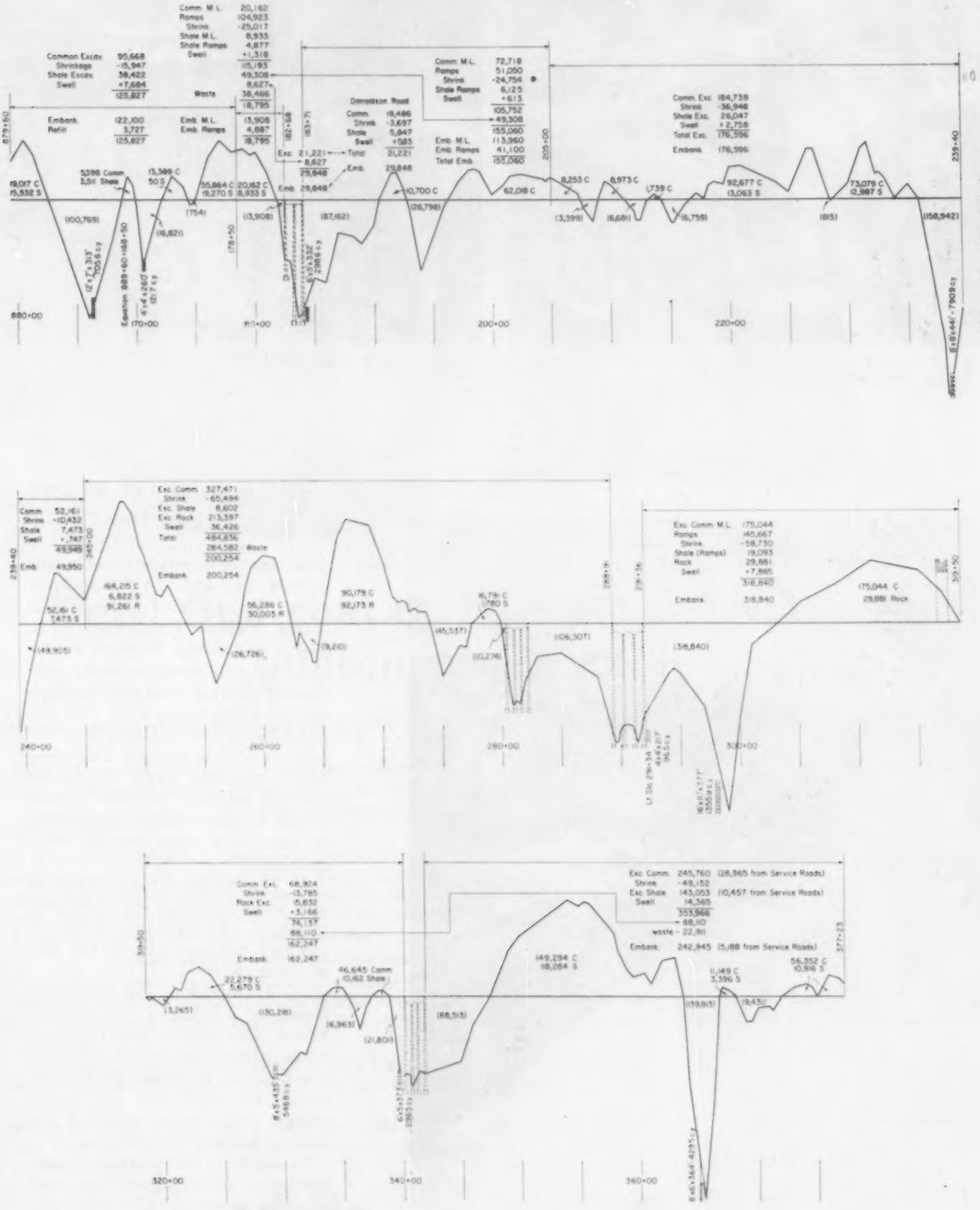
Morton Talbott, who is field-bossing this work, explains that good PM is chiefly a matter of "riding herd"—of seeing that the factory recommended routine is actually followed, every day for every machine. The Talbott practice is to catch machines when convenient at the noon lunch break for refueling, greasing and general inspection. Other machines are serviced out along the haul roads.

Oil and fuel filters are watched with particular care and changed to a schedule that insures clean crank cases, transmission and fuel tanks—an important factor alone in achieving that 90 percent availability that so few contractors are able to do.

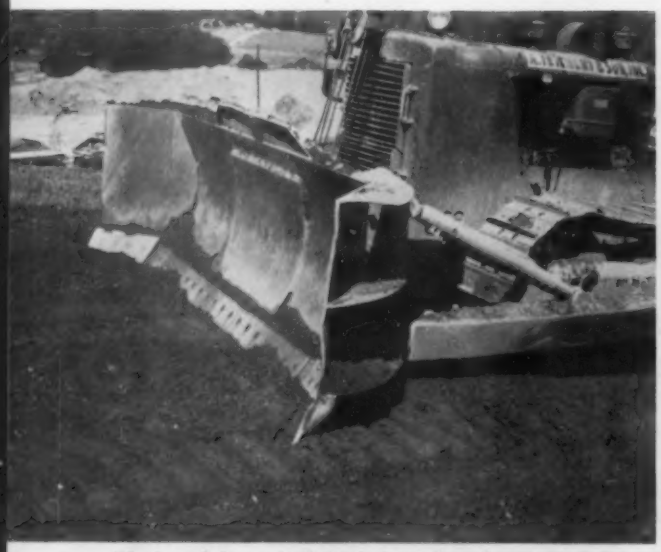
The Talbott projects, part of the Kentucky department of highways "I" program, is being handled out of the department's Covington district, C. O. Yochum, district engineer, with Robert K. Capito and Charles H. Campbell, resident engrs., Kenton County Proj., and T. P. Sandusky resident engineer, Boone County Project.

How Cut and Fill Quantities Were Detailed for One Talbott Job

(As described on pages 88-91, concluding on page opposite)



Work sheet of cut and fill details prepared by Talbott Construction to aid in planning the handling of scrapers. This for one of the two I-75 contract sections.



Final push-in to feed the belt loader: dozer with wings pushed material into a slot maintained by the straight-bladed dozer.

Shoulder aggregate being deposited by the tandem bottom-dumps, as seen in October in late job stage.

BASE AGGREGATE PLANT

Continued from page 76

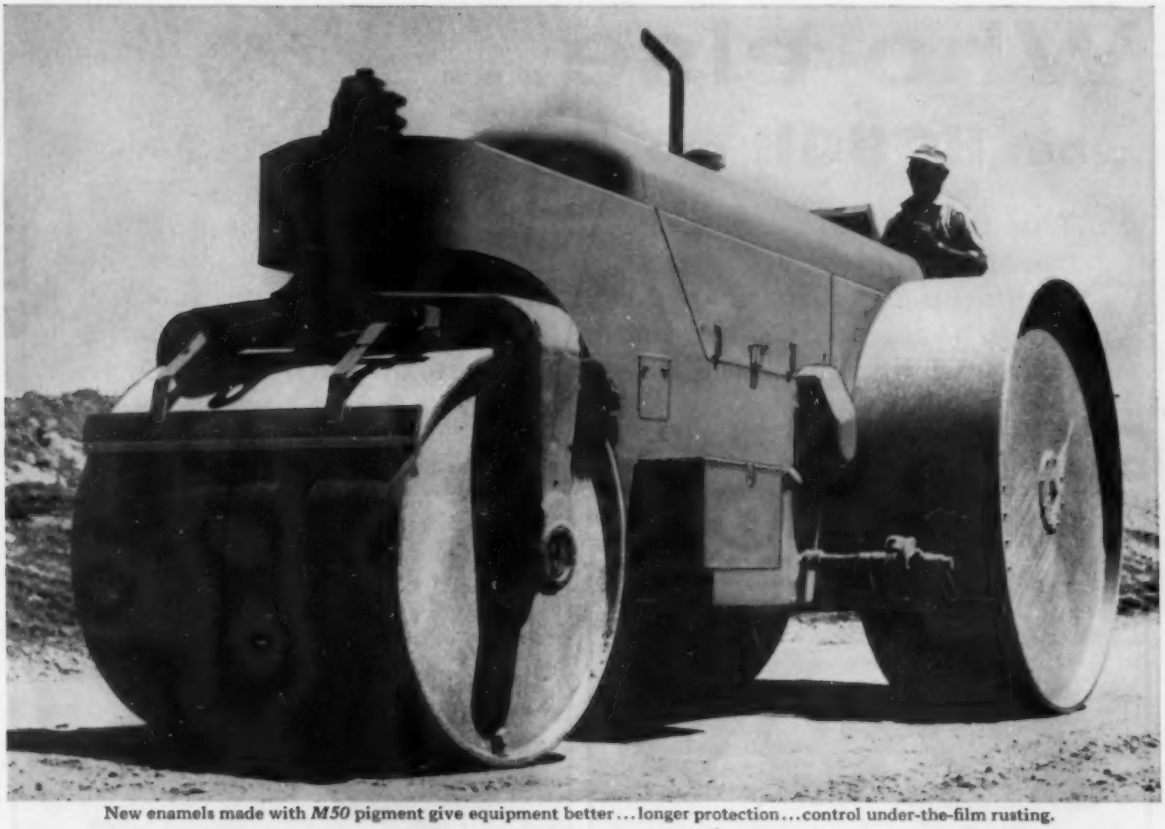
flow, aggregate dropped by the pair of belts was dozed to the stockpile center by a pair of International TD24 tractors fitted with 12-ft. blades and wings. A third tractor (Cat D8 with straight blade) performed general stockpile management and teamed with the two machines to slot material into the loader's feeding hopper. The wing-blades working singly or paired brought material in from various angles, feeding a trench maintained by the third dozer for the final push-in.

9. The belt loader was of a type now widely used in the west, consisting of a feeder box and electric powered belt framed into the side of the stockpile.

10. Transport to the grade was done by Lindeman using Gar-Wood, Trailmobile and Fruehauf bottom-dumps in tandem. Material was laid out by motor grader and rolled by steel and pneumatic rollers. Long scales recorded the tandem loads in a single stop.

So much for the production and placement of untreated base and shoulder material. The same material when used for cement treated

Continued on page 156



New enamels made with *M50* pigment give equipment better...longer protection...control under-the-film rusting.

New! One-coat equipment enamels with built-in rust inhibition...

keep on fighting rust even when damaged in service

Now, for the first time, you can have the rust inhibition of a primer and the durability of a finish coat, combined in a single coat of enamel.

And what is more, the paint can be tinted to match most standard equipment colors.

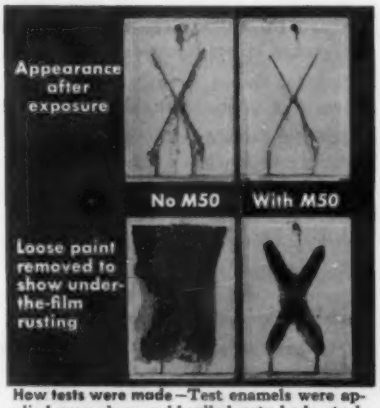
What gives these new one-coat enamels their exceptional properties is a unique new type of pigment, *M50*® basic lead silico chromate. In this pigment, the active ingredient is basic lead chromate solidly fused to an inert core. Fused lead chromate has not only exceptional rust inhibiting action, but also superior resistance to weathering.

Greatly inhibits under-the-film rust creepage, too

As you've probably noticed, when ordinary enamels are nicked or damaged in service the rust that starts spreads under the paint in no time. As this rust creepage progresses, paint flakes off to open the way for further corrosion.

Exposure tests (see photograph at right) at National Lead Laboratories show that this damage is very sharply reduced when *M50* pigment is in the enamel.

Before you order paint again . . . look into these unusual new enamels. They can be made up by your regular paint suppliers in nearly all standard equipment colors.



How tests were made—Test enamels were applied over clean, cold-rolled auto body steel, scored, and then exposed to 5% salt fog for 300 hours. The two panels at top permit you to compare appearance of enamels after exposure. The two panels at bottom have loose paint removed so that you can compare the true extent of rust creepage under each enamel. Note also, the greater film strength shown by the *M50* enamel.

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This factual data on PAYLOADER four-wheel-drive, rubber-tired tractor-shovels in each of 1, 2, 3, and 4 yard sizes points up the advantages of their design, performance and safety features. Comparisons include all competitive units from manufacturers' printed specs as of April 1, 1960.

1 cu. yd. H-30 PAYLOADER®

More Power: H-30 has 17% more horsepower than next most powerful machine in this category.

More Dumping Clearance and Reach: The H-30 has 4" more clearance and over a foot more reach.

Safety Boom Arms: All moving members pivoted in **front** of operator. **Exclusive** on the H-30.

Safety Ladder: Makes access to the operator's compartment easy and safe. Another **exclusive.**

"Full" Power-Shift Transmission: No manual shift, working to travel range. "PAYLOMATIC" transmission Hough designed and manufactured.

Four-Wheel-Brakes: Exclusive on the H-30 they permit equal stopping in both forward and reverse. Also sealed against dust and dirt.

"Operator's Choice" Brake Pedals: Dual pedals give the operator a choice of braking with or without transmission engaged. H-30 **exclusive.**

Closed Hydraulic System: Sealed and pressure-controlled hydraulic reservoir with renewable cartridge-type filter and fine-mesh screen. Another **exclusive** H-30 protective feature.

Separate Oil-Cooling Radiator: A fan-cooled "oil-to-air" heat exchanger cools transmission and torque-converter oil. Another **exclusive.**

Easy Accessibility: No other comparable unit has H-30 accessibility. Dip stick, filler cap, batteries, connections and service points reached from ground level.

2 cu. yd. H-70B PAYLOADER®

More Power: H-70 has more horsepower than the average of 9 competitive gas and diesel units.

More Dumping Clearance: The H-70 has 4" more clearance than average of 9 competitive units.

Safety Boom Arms: Underslung design keeps the operator safe from all moving members.

Safety Ladder: Makes access to the operator's compartment easy and safe. An H-70 **exclusive.**

"Full" Power-Shift Transmission: No manual shift from work to travel ranges. "PAYLOMATIC" transmission Hough designed and manufactured.

Four-Wheel-Brakes: Hydraulic, power-boosted four-wheel-brakes with separate parking brake. Front brakes sealed against dust and dirt.

"Operator's Choice" Brake Pedals: Dual pedals give the operator a choice of braking with or without transmission engaged. A Hough "first".

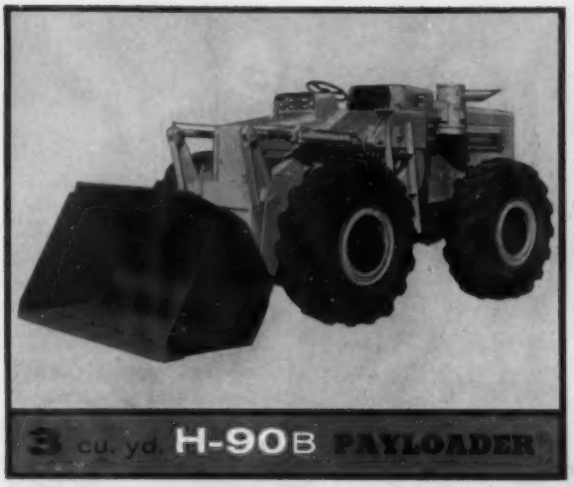
Closed Hydraulic System: Sealed and pressure-controlled hydraulic reservoir with renewable cartridge-type oil filter and fine-mesh screen.

Separate Oil-Cooling Radiator: A fan-cooled "oil-to-air" heat exchanger cools transmission and torque-converter oil. An H-70 **exclusive.**

Torque-Proportioning Differentials: Transfer up to 24% more power to best traction wheels.

Easy Accessibility: Extra attention has been given to providing utmost accessibility to all service points.

. . . for more details circle 325 on enclosed return postal card



3 cu. yd. H-90B PAYLOADER

4¼ cu. yd. H-120 PAYLOADER

More Power: H-90 has 24 more horsepower than the average of 8 competitive diesel models.

More Dumping Clearance: The H-90 has 10" more clearance than average of 8 competitive units.

Safety Boom Arms: Underslung design keeps the operator safe from all moving members.

Safety Ladder: Makes access to the operator's compartment easy and safe. An H-90 **exclusive.**

"Full" Power-Shift Transmission: No manual shift from work to travel ranges. Improved units have better operating characteristics.

Four-Wheel-Brakes: Power air brakes with big braking area on all four wheels assures easy, safe handling of the H-90 at all times.

"Operator's Choice" Brake Pedals: Dual pedals give the operator a choice of braking with or without transmission engaged. H-90 **exclusive.**

Closed Hydraulic System: Sealed and pressure-controlled hydraulic reservoir with renewable cartridge-type oil filter and fine-mesh screen. Another H-90 **exclusive** protective feature.

Separate Oil-Cooling Radiator: A fan-cooled "oil-to-air" heat exchanger cools transmission and torque-converter oil. An H-90 **exclusive.**

Torque-Proportioning Differentials: Transfers up to 24% more power to best traction wheels.

Easy Accessibility: Extra attention has been given to providing utmost accessibility to all points requiring checking and service.

Power-Steering: All "PAYLOADER" four-wheel-drive units have hydraulic power-steering.

More Power: H-120 has 38 more horsepower than next most powerful machine in this category.

More Dumping Clearance and Reach: H-120 has 4" more clearance, 6" more reach than next unit.

Safety Boom Arms: All moving members pivoted in **front** of operator. **Exclusive** on H-120.

Safety Ladder: Makes access to the operator's compartment easy and safe. Another **exclusive.**

"Full" Power-Shift Transmission: Hough-built, full-reversing, constant-mesh, countershaft-type with balanced rotating hydraulic clutches.

Four-Wheel-Brakes: Power air brakes with large braking area assure easy, safe handling at all times.

"Operator's Choice" Brake Pedals: Dual pedals give the operator a choice of braking with or without transmission engaged. H-120 **exclusive.**

Separate Oil-Cooling Radiator: A fan-cooled "oil-to-air" heat exchanger cools transmission and torque-converter oil. Another **exclusive.**

Better Balance: Exclusive use of lightweight, extra-strong "T-1" steel for box-section boom arms saves over a ton of "dead-weight" on the load-carrying end.

Better Stability: Counterweighted by approved use of dry ballast material in rear tires. Lower center of gravity, 50% of weight below rear axle. **Exclusive.**

Protection: Special dry-type air cleaner gives 99.8% dust removal efficiency under most adverse conditions. Sealed, pressure-controlled hydraulic system has cartridge oil filters and fine-mesh screens. **Exclusive.**

Extras: Canopy-type cab with windshield wipers and special lights is standard equipment.

HOUGH, PAYLOADER, PAYMOVER, PAYLOGGER, PAYLOMATIC and PAY are registered trademark names of The Frank G. Hough Co.

HOUGH®

THE FRANK G. HOUGH CO.
LIBERTYVILLE, ILLINOIS
SUBSIDIARY — INTERNATIONAL HARVESTER COMPANY

THE FRANK G. HOUGH CO. 5-B-1
768 Sunnyside Ave., Libertyville, Ill.
Send data on all "PAYLOADER" models and attachments.
Name
Title
Company
Street
City State

. . . for more details circle 325 on enclosed return postal card

BASE AGGREGATE PLANT

Continued from page 152

subgrade was centrally mixed—the first departure from road mix for cement treatment in Central California. Subcontractors Gunner-Gramatky Inc. of Carmichael, California, set up a Pettibone-Wood traveling mixer as a stationary plant, where water and cement were blended in. The mix was delivered by Simis, deposited between the paving forms, spread by an Adnun spreader, and rolled with a 3-wheel and a Bros combination steel and pneumatic roller, followed by the usual MC-2 curing seal application.

Cement-treated subgrade material is being centrally processed more often these days in the California road program. The spec-

Tandem bottom-dumps waiting for their turn under the belt loader.

The twin plant as seen from the stockpile side. Note the tandem haulers in the background, waiting on the ramp for dumping into the feeder.

ifications frequently set the job up this way to insure more uniform cement content as well as better moisture and gradation control.

Also more exacting attention to securing evenness in the treated subgrade is a current concern of both the engineers and the contractors in California. On this job Teichert's paving forms for the 8-in. concrete slab and the 4-in. treated base consisted of steel road forms mounted on 4″x8″x20′ wood planks. The planks not only provided the 12-in. combined depth wanted, but also resulted in an unusually stiff combined form rail, insuring excellent evenness results for both the base and the finished concrete.

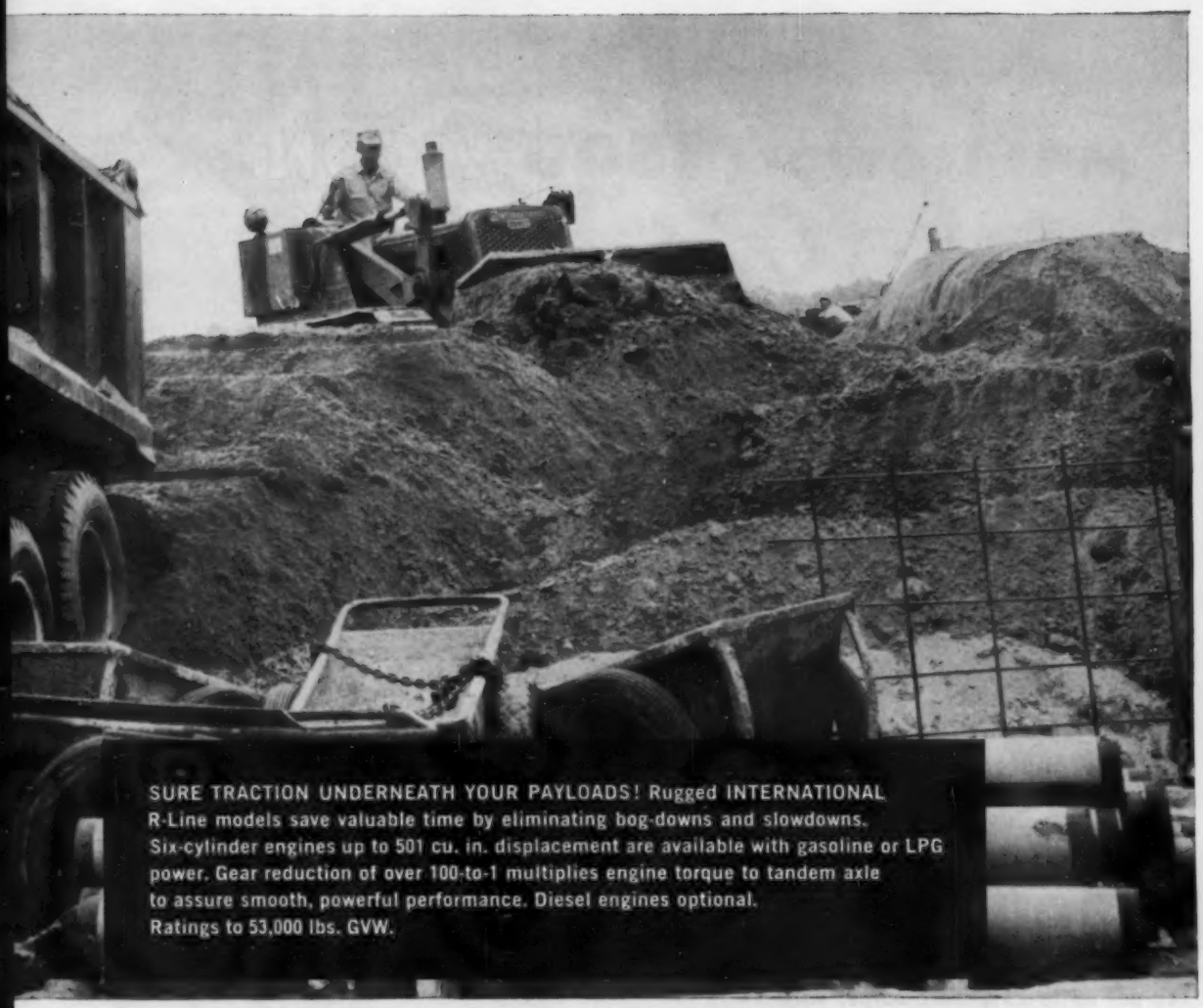
Continued on page 162

(Left): Note how concrete pavement was protected by mounding aggregate where the aggregate trailers had to cross. (Right): Both loads being weighed for a single ticket on long-bed scale.

TO STAY ON SCHEDULE,

Trip-saving V-8 power! Compact-design INTERNATIONAL dump models can give you extra trips every day. Advanced 345 cu. in. V-8 engine, combined with optional Select-O-Matic® transmission, means pull-ahead power on the highway... smooth power application under all conditions. Ideal for fast runs to mix plant or dump site. Tandem-axle models to 35,000 lbs. GVW.

Off-road, it'll do anything you could ask of a truck! 230 Series INTERNATIONAL Trucks go into construction areas, come out with giant-size loads. Extra heavy-duty frame and front end take all kinds of punishment – and you can get all kinds of power. Gasoline "sixes" up to 212 hp., V-8's to 257 hp., diesels up to 262 hp. with 695 lb-ft. of torque. GVW ratings to 73,000 lbs.



SURE TRACTION UNDERNEATH YOUR PAYLOADS! Rugged INTERNATIONAL R-Line models save valuable time by eliminating bog-downs and slowdowns. Six-cylinder engines up to 501 cu. in. displacement are available with gasoline or LPG power. Gear reduction of over 100-to-1 multiplies engine torque to tandem axle to assure smooth, powerful performance. Diesel engines optional. Ratings to 53,000 lbs. GVW.

DEPEND ON INTERNATIONAL!

Need a dump truck right away? Call on INTERNATIONAL right now! Dump truck models of popular sizes and specifications are ready for shipment within 24 hours from the INTERNATIONAL Truck Sales Processing center. A "pool" has been established to anticipate your emergency needs and equipment demands. Keep your job on schedule — contact your INTERNATIONAL Truck Dealer or Branch today!

INTERNATIONAL® TRUCKS WORLD'S MOST COMPLETE LINE IH®

International Harvester Company, Chicago • Motor Trucks • Crawler Tractors • Construction Equipment • McCormick® Farm Equipment and Farmall® Tractors

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A MAJOR ENGINEERING BREAK-THROUGH IN EXCAVATOR DESIGN

You get up to 25% more output with "integrated" controls, the "VICON" system of power application and control, and the new "interlock" drum arrangement

The Manitowoc 4500 Vicon is a 6 yard shovel or 7 yard dragline, incorporating an entirely new concept of excavator design and performance. Over 3 years of on-the-job-experience has proved its soundness of design, greater ease of operation; much faster operating cycles; greatly reduced maintenance costs; and far greater output from both shovels and draglines.

"Integrated" Controls Simplify Operation, Clutch Slippage Eliminated

Operating the Vicon is like flying . . . Cycle phases are that smooth, that "integrated"! Even green hands get results because it takes 50% less operator movement to run the machine.

Conventional engine throttles have been eliminated. Each clutch control lever in the high visibility Vicon pilot house is *also* a throttle! Engaging a swing or drum clutch, for instance, involves simply pushing (or pulling) the clutch control lever from dead center (stop) position. The further the lever is moved in the natural direction of the machine's movement the faster and harder it works in that direction.

There is no slippage when clutches are engaged because the first 10° of control lever movement does not activate the throttle—therefore, clutch engagement is effected at low engine R.P.M. and almost zero clutch and drum R.P.M. By *continuing* to move the clutch control lever, which is also the throttle, the machinery is accelerated via fast, smooth, three stage torque converter against the load . . . without *any* clutch slippage.

No Brakes Needed To Stop The Swinging Action

In conventional excavators it is normal to apply considerable "braking" effort to halt the "swing" of the machine so that it can be started in the opposite direction. *Before* "Vicon" it was necessary for the opposite clutch or swing brake to take this thrust (the disadvantages of excessive friction heat and wear are obvious). With Vicon the machine stops swinging one way and very smoothly accelerates in the opposite direction because the torque converter acts like a brake, absorbs directional thrust, eliminates shock and slip on the swing frictions and then provides instant acceleration for the return swing.

Engine Application Has Great Versatility

"Vicon" is two engine power applied in a way never before used for power shovels and draglines . . . and with boundless advantages in performance, maintenance characteristics, and production! One engine provides the power for swing and travel while the other powers the drums . . . allowing you to perform several functions simultaneously, in a smooth blending of cycle phases that provide operating speeds beyond the capabilities of conventional excavators.

Vicon design gives you faster, smoother clutch engagement with drastic improvements on the conventional problem of wear, heat and fade . . . yet you maintain top working speeds.

With the Vicon power application, certain operating advantages are immediately obvious . . . For instance, one engine may be slowed down to accommodate an extremely tough phase of the cycle without jeopardizing the ability of the other engine to immediately take over the following phase of the working cycle. Or, one engine may complete its assignment at a relatively high speed while the power of the other is introduced at idling R.P.M. to take over the next phase of the work. Valuable production time is not lost because of engine "lug down". On the other hand, clutches are not jammed into engagement at high and harmful engine speeds . . . The result, a smoother, faster, more economical operation with greater output, longer machine life, better all-around performance.

"Interlock" Reduces Brake Use By 50%

Vicon operation is so smooth that the machine seems to loaf on the job. Yardage totals, however, tell the true story. For instance, on the Vicon dragline you get the new "interlock" drum arrangement which suspends the dragline bucket in the middle of an endless line . . . cuts brake use up to 50% and you take advantage of full horsepower on the hoist (instead of burning it up on the brakes).

Vicon Has Doubled Drum Brake Capacity

You get higher speed dragline cycles than were ever before possible—and designed into this new Vicon component is another innovation included specifically to give pin-point control and increase production.

Both outside flanges of both the front and rear drums of the Vicon serve as big, fast acting efficient braking surfaces. The advantages are readily apparent on various stripping locations where the operators take pride in maintaining such pin-point casting control that they actually trim and maintain vertical side walls. It is common, for instance, to see a Vicon operator taking advantage of Vicon "Interlock" making high

speed casts with the bucket held in a vertical position (teeth down). The bucket rushes out at full speed, is stopped smoothly over the top of the cut and then allowed to drop vertically to trim the wall. Vicon dragline drum "interlock" and drum brakes are in a class by themselves. Production gains are assured!

Other Innovations Are Yours With Vicon

For instance, a big universal radiator system gives you double the cooling capacity. Advantages of the Vicon cooling system are never more obvious than in prolonged travel with the Vicon maneuvering easily from one job location to the other. Travel, a situation embodying the most serious over-heating possibilities for the conventional machine, is no problem for the Vicon . . . which simply utilizes two engine cooling capacity for the operation of a single power system.

Shovel Has Less Weight—More Power On "Business End"

The Vicon shovel has all the advantages of the big, tough Model 4500 tubular style dipper stick and having separate hoist lines rigged from either side of the shovel bail to the other end of a reduction drive mounted on the base of the shovel boom—eliminating the weight and instability of a bail sheave at the bucket, plus bad fleet angles on the hoist cables.

There are many, many more design and operating features adding up to more output—reduced maintenance costs and lower cost yardage. Before you buy any machine in this class, it will pay you to get the complete story on the sensational 4500 Vicon.

Manitowoc

MANITOWOC ENGINEERING CORP.

(A Subsidiary of The Manitowoc Company, Inc.)

Manitowoc, Wisconsin

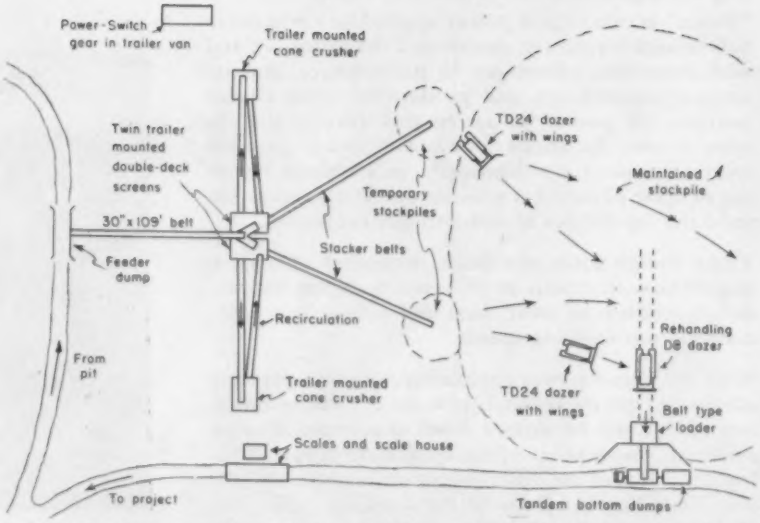
SHOVELS	CRANES	DRAGLINES	TRENCH HOES
1¼ — 6 YDS.	25 — 125 TONS	1¼ — 7 YDS.	1¼ — 3 YDS.

. . . for more details circle 347 on enclosed return postal card

BASE AGGREGATE PLANT

Continued from page 157

Wayne Russell was project manager and A. Human superintendent for A. Teichert & Son, Inc. L. O. Kendall was resident engineer for the California Division of Highways, under the Marysville district.



Layout showing components of the screening and reduction plant set up by A. Teichert & Son, Inc., for high-speed base aggregate and other materials.

Tests Show Grader Blade Saving

Extensive grader blade field tests now show that a new three-piece blade installation can save the grader owner as much as 70 percent in grader blade costs. This three-piece installation consists of a hardened thicker blade in the center and two conventional blades on the ends.

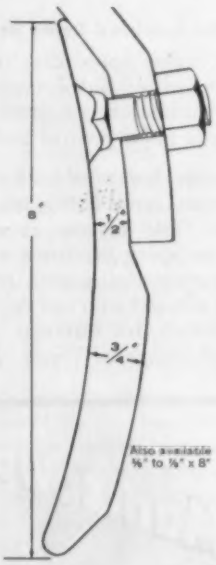
Two factors, the crown of a roadbed and the concentrated weight of the machine, cause accelerated wear on the center of the blade. In conventional applications two-piece grader blades "crown" or wear excessively in the center, making good blading operation difficult and increasing blade waste costs.

In practice, many sets of grader blades are thrown away before they are completely used because they are crowned too much for good road work. The three-piece grader blade arrangement with heavier hardened blade in the center prevents this excessive crown. Used in the tests were Paper Calmenson and Company's Pacal "X-Tra Edge" blade.

The New Pacal X-Tra Edge hardened blade is self-sharpening. While regular blades are apt to curl front and back, the hardened center blade remains sharp giving more efficient grading. The increased thickness naturally increases strength when the wear factor of a standard two-piece arrangement using two ½ in. x 6 in. blades is considered as 1.0, the greater wear factor of the three-piece arrangement with hardened, thicker center blade is 5.5—more than five times the wear.

Pacal heat treated bolts were used in these tests. Because of increased wear and added life of these heavier blades, regular plow bolts were not expected to stand up through the entire life of the blades.

MOTORISTS RUNNING OUT of gasoline on the New York Thruway during 1959, 1,459 in all, were given enough gas (2 gal.) to get them to the next service area, under a new Thruway policy.

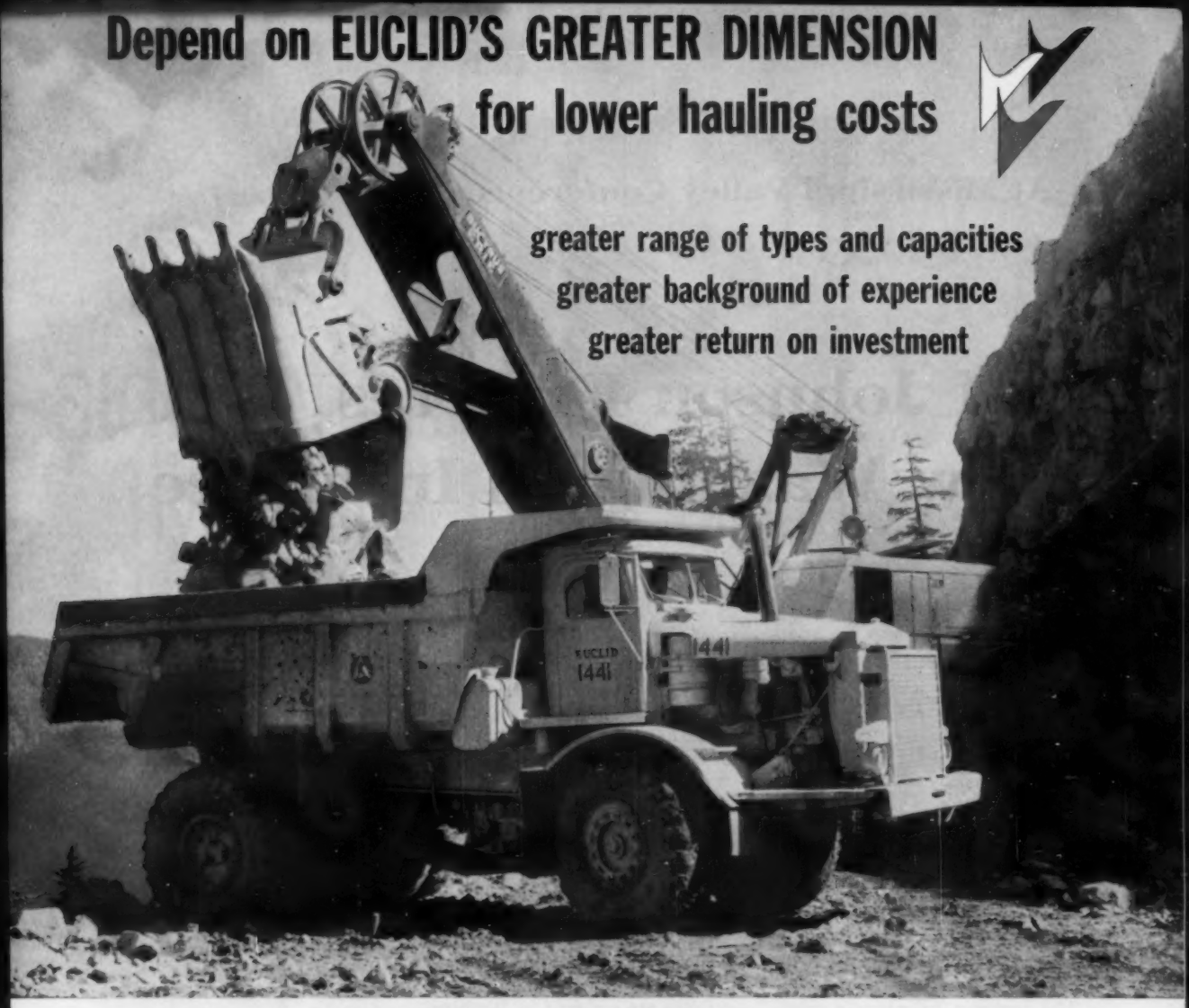


Larger, heavier grader blades cut maintenance costs 70%

Blade Size	Wear Factor	Cost Factor per hour of maintenance
½" x 6"	1.0	1.0
½" x 8"	2.0	.58
½" to ⅝" x 8" hardened center-section	5.5	.30
⅝" to ⅞" x 8" hardened center-section	6.6	.29

Blade used in test, and test data.

Depend on EUCLID'S GREATER DIMENSION for lower hauling costs



Model R-27 has rated payload of 54,000 lbs. and a heaped capacity of 26½ yds. . . . available with Cummins 335 h.p. and GM 336 h.p. engine . . . 4-speed Torqmatic Drive with converter lock-up and Torqmatic Brake . . . dual hydraulic booster steering . . . 18.00 x 25 tires on all wheels . . . rugged body with twin hoists . . . top speed with full payload, 34 mph.

Backed by better than 25 years of specialized experience in building off-highway earthmoving equipment exclusively, Euclid's modern rear-dump line incorporates advanced engineering that is a result of unmatched field experience. From the 10-ton Model R-10 to the big 55-ton "Euc" with two engines and a total of 672 h.p., Euclid Rear-Dumps meet today's requirements for big performance.

This greater dimension . . . in a wide range of capacities, in choice of engines, transmissions, tire sizes, and in type of hauler . . . in the parts and service facilities of Euclid's world-wide dealer organization, too . . . can mean lower hauling costs on all kinds of earthmoving jobs.

EUCLID Division of General Motors, Cleveland 17, Ohio
Euclid (Great Britain) Ltd., Lanarkshire, Scotland

A complete line of rear-dumps with payload capacities of 10, 15, 18, 22, 27, 40 and 55 tons . . . also semi-trailer models of 12, 22, 35 and 50-ton capacity.

GM GENERAL MOTORS EUCLID

EUCLID EQUIPMENT

FOR MOVING EARTH, ROCK, COAL AND ORE

At Mississippi Valley Conference:

Alf Johnson Explores New Washington Influence

"Let's take a fresh look at the national highway program, where it stands, the troubles confronting it, the administrative problems faced by the highway departments."

It was in this spirit that A. E. Johnson, executive secretary of the American Association of State Highway Officials, talked informally but often candidly at the Mississippi Valley Conference of State Highway Departments, held March 17-19 at Chicago.

The highway program's chief overall problem is one of financing, Alf Johnson reminded, and the postwar interest in toll roads—now being revived in several states—he regards more as a symptom of need than a cure.

The concern now is with the federal mechanism as it relates to highways, he said. Road building today is "big business," with such large-scale federal financing involved that many Washington people are getting into the act. This is introducing new risks into the long-range course of the program. One risk is the possibility of subjugation of the states to a lesser role in highway administration.

Another is the likelihood of influence being exerted by men in high position in Washington who don't have a background on highway affairs.

For 43 years a federal-state relationship has been maintained which has permitted a continuing, strong, effective administration centered in the states. This set-up which has given the nation its uniquely developed highway system has been based on reimbursements, not grants, there being an important distinction between the two words.

Now it seems, continued Alf, that decisions and policies have moved up a step. People making high-level decisions are centered in Washington, and these people are not always seeking the advice of those who have had hard-gained experience. The new perspective includes the fact that the Washington administration is reviewing the entire road program from the budgeteer and the military standpoint as well as that of highway need.

Anything that involves important money is politics, and politics in an election year is of overshadowing concern, this speaker reminded.

Johnson then went on to look briefly at the three new Washington committees that concern the road people. One is the subcommittee of the House Ways and Means Committee (the money committee). This group was set up because the federal highway program as created in the 1956 and 1958 acts ran into financial difficulties, due to the "incompatibility" of Titles I and II. Johnson defended the 1958 cost estimate made for the Interstate program as a sound one. The Byrd trust fund limitations on money outgo, plus the speed-up voted that year as an anti-depression effort, made the present financial dilemma inevitable.

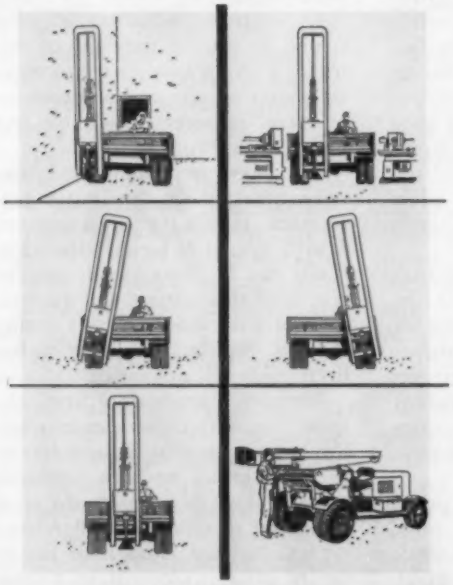
"How high is high enough to make high-level policy decisions on highways?" asked Johnson of the Chicago audience. Noting that a recent Commerce Department official had referred to policies as having heretofore been "made by AASHO," Johnson pointed out that it should seemingly be high enough a level when state highway commissioners make recommendations to Congressional committees, as a basis for informing lawmakers of needs on which they can plan new financing legislation. The concern now is that some of the new committee people who are bypassing state advice do not seem to know the score.

A second committee is the one set up by the White House under General Bragdon. This group is rumored to be tinkering with many aspects of vital concern, and is critical of the Bureau of Public Roads. The recent manual issued by the Bureau as a guide in making the

Continued on page 214

new Arrow side-action hydraulic hammer

New Arrow model works across width of 8′



Here is a new Arrow—Model A-130-AS—that gives you all of the money-saving features of the standard Arrow PLUS the advantages of Side-Action. Extensive field testing has proved the new Arrow to be an even greater money-maker for contractors.

With the new Side-Action Arrow, you can tamp or hammer a distance of 7 feet from one side to the other straight across the front of the machine—8 feet by angling the hammer leads. You can work close to a building or other obstructions—cutting asphalt, breaking concrete, tamping backfill or driving stakes or piling. You can work from side to side or in a straight line forward or backward—as with a standard Arrow—or you can use any combination of these actions that will best do the job.

At the touch of a control, you can shift the hammer rapidly from side to side, stopping it wherever you wish. You can set the hammer stroke control on automatic to deliver blows of uniform impact at a uniform rate—or you can control the hammer manually. Other controls tilt the tower forward or backward or at an angle, or fold it back, reducing machine height to 6′2″ for going through doorways or for highway travel.

For complete information about the new Arrow Model and its money-making features, WRITE TODAY.

ARROW DENVER

ARROW MANUFACTURING COMPANY

194 W. Dakota Ave., Denver 9, Colorado

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Bituminous
Roads And Streets

Bituminous features appear between pages 166 through 190.

How Good is Your Bituminous Distributor?

Reviewing design and operating details of this basic machine that effect accuracy of application.

The quality of highway surface treatments, seal coats and penetration courses constructed with liquid bitumen depends of course on a number of factors. Much has been written about the fine points of determining which grade of asphalt to use, what amount and gradation of chip cover, and whether and how to drag or roll.

The materials control aspect is indeed vitally important, and when good control of procedures is achieved, the engineer is on his way to giving the public a durable, smooth riding highway.

Less often discussed in the technical publications is the functioning of the distributor itself. Noted here are some of the features of distributor design, function and operation considered by the distributor manufacturers to be essential to getting economical and well controlled results.

Some reference to material grades will be interwoven into this discussion, since the materials are an inseparable part of the job. Quoting from the Asphalt Institute's Manual of Design and Construction of Asphalt Roads and Streets, section on Seal Coats and Surface Treatments: "The secret of a good job is good equipment, good stone, good weather, proper formula, and getting the cover stone in place while the asphalt is still highly fluid."

The distributor is far more than just a tank with a spray bar. It consists of the following components, each designed and constructed to make the most of long experience:

1. A tank (usually insulated) having heating flues, baffle or surge plates, manhole and overflow pipe, etc.

2. An engine driving a pump to pump material into the tank, circulate material in the tank while heating, pump the load off through a spray bar, through a hand spray or back into a storage tank, etc.

3. A spray bar with nozzles through which the material is applied to the road surface.

4. Controls including a valve system to control the flow of material, a pump tachometer to register pump output and a bitumeter or travel tachometer to show feet per minute traveled.

The most immediate and constant question of distributor performance is, will it apply a *uniform film* of asphalt or tar material? The result can be determined only by test, and this testing will be subsequently discussed. Merely noting that an "all black" application has been made will not suffice.

Accurate distribution from the spray bar is important even when the bitumen is diluted by solvents, as in cutbacks, or with emulsion dispersion. The solvents do tend somewhat to offset spray bar inaccuracy, but not enough to justify use of poor equipment or permit careless operation.

On the other hand, use of heavy asphalts has its special problems.

No distributor can make a uniform spread unless the spraybar's height is accurately adjusted to the crown configuration. One of the many essentials here reviewed.

Such asphalts may cause delays in getting the spray bar and lines hot, and heat may need to be applied to the pump before it can get started. Such trouble, however, is not encountered with a really good circulating spray bar. And heating the pump need not be a serious problem if all material is drained from the pump and header system after use. Most distributors have to have this material drained out. The material in many circulating spray bars can be returned to the system.

The spraying pattern also is of vital concern. Much has been said about double and triple lap. If nozzles are on 4 in. centers—double lap as illustrated in catalogs and manuals means that the base of the triangle, formed by the fan, is 8 in. wide. The center of this fan is coming approximately straight down, but the sides hit the road at an increasing angle and at possibly 30 psi pressure. Triple lap increases the angle. The lighter the material the more tendency it will have to run, or spread out over a wider strip.

The main advantage in multiple lap is that poor nozzles tend to offset each other. To illustrate, with triple lap, if one nozzle is missing completely, the two adjacent nozzles are still lapping this area so the error in distribution is not so obvious. Unfortunately, if heavy streams are present in lapping fans, the second or third fan hitting film laid by the first fan, can disturb this film.

Uniform coverage is important, as there is no point in applying a considerable excess of material in order to get the minimum requirement where distribution is weak. In seal coat work, the excess streaks show up as fat streaks, or hold excess stone. In most cases, the irregularities show up as streaks where the cover stone is not retained.

Of course, the amount of application required must be increased by the amount of solvent present. As an example, 0.3 gal. of RC2 or MC2 is required to secure a 0.2 gal. per sq. yd. application of asphalt.

Where cut-back asphalts are used, the curing time is much longer and vehicle speed should be kept at a minimum much longer.

Controlling Rate of Flow. The common method of controlling distribution down the road is by setting the auxiliary engine governor to hold a pump speed to pump a predetermined number of gallons per minute, and then driving a set number of feet per minute. Due to variation in pump design, clearance, pump tachometer and bitumeter errors, etc., the actual application rate may vary from those given in the application charts.

An actual application over a measured distance, measuring the material in the tank before and after the application allows:

(1) Adjusting the pump speed to correct for inaccuracies, or

(2) Changing truck speed to ap-

How a Poor Spraybar Costs Money

By H. A. Cartwright,
Berry Corporation

- Need to flush bar into ditch—time and material wasted.
- Having to put torch on spray bar—time wasted.
- Cleaning nozzles and having to stop spray to unplug clogged nozzles.
- Screwing blanks in—or removing them and replacing nozzles.
- Need to flush bar with solvent, except where light material is to follow spraying of asphalt cement, etc.—wasted solvent.
- Hand spraying an area prior to take-off—necessary because nozzles are not all firing instantly. (Nozzles that do come on, flood part of the area which can make it slippery and require extra chips)—not accurate, slows up job.
- Uneven distribution across the bar, resulting in cover stone retained in streaks, or stripped off.

ply the quantity pumped over a greater or lesser distance.

A bitumeter or travel tachometer mounted in the cab helps guide the driver. These instruments are more accurate than pump tachometers, but are useless at very low truck speeds and cannot be read too accurately at truck speeds below 300 ft. per min. Assuming 100 percent accuracy of the instrument and ability to read it accurately, there is still the problem of maintaining a constant accurate truck speed under all conditions.

Another method of flow control is to run the pump to deliver a surplus of material and bypass this surplus by means of a pressure relief valve. For accuracy, this method requires all nozzles to be the correct size for the pressure within the spray bar. The nozzles should be hot before spraying. Actual volume will vary with the viscosity of the material, and the viscosity varies with the temperature. This method is not approved by all state highway departments.

Seal and prime coats, which involve relatively small rates of application, are particularly in need of good distributor and spray bar control for best results.

Distributor Design. A well designed distributor has numerous refinements. The tank heads should be flanged and reinforced, the surge or baffle plates adequate, and the welding high grade. A large manhole with quick opening pressure relieving cover should be provided and a basket type strainer supplied for the manhole. An overflow pipe should be located near the center of the tank and should extend at least 4 in. above the top of the tank.

The heating flues, in combination with the system to circulate material in the tank while heating, are an important factor. Considered adequate by most makers is the U tube with a burner firing into one end of the tube and exhausting into a stack at the other end, with material pumped from the bottom at one end and returned to the other end; or, to the same end and aimed forward.

In some cases, flue liners are added to protect the tube from burning out under the intense concentrated heat. Too high tube wall temperatures can injure the bitumen, and can also distill off solvents in the material, particularly when heating a partial load. Some specifications call for a burner capacity that could result in too high a wall temperature.

Primarily, asphalt should not be subjected to any temperatures over 100 deg. F above the application temperature of the material.

An engine and pump that will adequately pump material into and out of the tank to perform the various functions might answer the purpose. The gear ratio is important since hardest-to-pump materials are the cold, viscous materials that require slow pump speeds. After heated to spraying temperature, they pump easily and the pump speed in relation to engine speed can be higher.

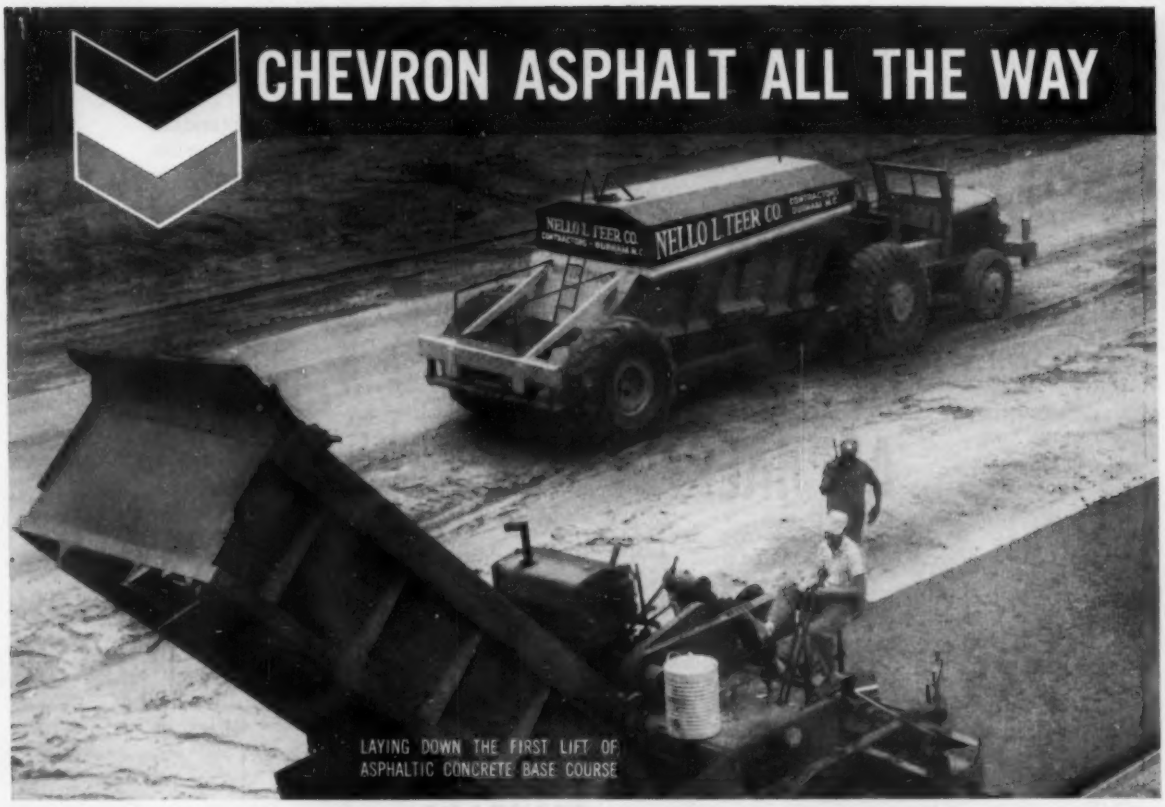
The header and the piping system are important and should be as compact as possible, with no pockets where heavy materials can set up. It should be possible to drain the entire system quickly, either putting the material back into the tank, or, in case of engine breakdown, etc., on the ground. Light materials are no problem and can remain in the system. The valves should be of the leakless type and connections made up with welded, flanged connections wherever possible.

The Spray Bar. This is the most important part of a distributor, since the quality of the job depends on the exact distribution of material across the road. Nozzles must be so designed that an equal amount is sprayed on each inch of the road width. A fan-type spray forms a triangle in respect to the road surface; variations in height vary the base width of the spray.

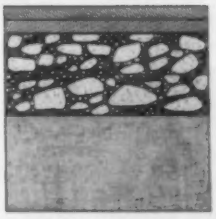
The variations in bar height may be the result of changes in load on the truck frame, crown in the road not equaled by a similar crown in the spray bar itself, or tilting the spray bar in respect to the road, truck tilt while going around a curve, etc. Variations in the base width of the triangle means either more or less lap on the surface sprayed by the adjacent nozzles.

A photograph of a spray bar operating properly should show the fans to be uniform in width and intersecting on a straight line. Where fans start to lap at varying

Continued on page 171



Nello L. Teer Company Job In North Carolina Includes Record Asphalt Paving Award



CROSS SECTION VIEW OF PAVEMENT CONSTRUCTION

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Overall, the "Black Base" and I-2 Wearing Surface required 210,000 tons of Asphaltic Concrete.

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BITUMINOUS DISTRIBUTOR

Continued from page 168

heights, the fans cannot be uniform.

The feed lines, spray bar and nozzles should all be as hot as the material when the nozzles are opened. To get the ends of a circulating spray bar hot, material must be forced to both ends in sufficient volume to heat the bar, valves and nozzles. If you have ever watched a hand spray operated you will have seen that the fan at the start is narrow. As the hose, hand spray and nozzle heated up from material flow, the fan widens out. Suck back spray bars must be heated by the hot material.

Using nozzles of graduated size with the smallest nozzles near the feed points in a spray bar, to offset the higher pressure at these points, is one method of securing uniform application. Nozzles should be marked and care taken to place them properly, or this method is ineffective.

The standard plug type nozzle depends on the intersection of a drilled hole with a milled slot to form a fan. Accurate machining is necessary for uniform output, spray balance and uniform fan. Spray should be checked even on new nozzles to assure even coverage.

The distributor should have a minimum of piping and there should be no spots where heavy material can be trapped and set up. This piping should be ample in size, with welded fittings and flanged connections rather than screwed connections where possible.

The pump should have a full line to the sump on the suction side, including a full flow cock of the same size as the pump. Standard plug cocks of all sizes, not specified as full flow, restrict the flow to about 70 percent of pipe size.

The pump should be big enough to supply the full spraybar length. The number and size of the nozzles control the pump output required. This usually means a 4-in. pump for long spray bars and a 3-in. pump where only half of the road is to be sprayed at one time.

Many specifications call for a pump with a capacity that could never be used with the length spray bar specified. Also, where very heavy applications are to be made with a long spray bar, a 4-in. pump (the largest size used on any standard distributor made in this country) is taxed to capacity and an auxiliary transmission is necessary to obtain slow enough operating speeds. However, the worst mistake in buying bituminous spraying equipment is accepting a distributor with too small a pump, etc., to save on first cost.

The valve system should be so arranged that in normal operation, there is always an open line on the discharge side of the pump.

It should be possible to either suck all lines clean, including the spray bar, or pump all material back into the tank. The return line to the tank should be so designed that material cannot siphon or otherwise get back into the piping or spray bar.

Air will not push liquid *up* a pipe. Material in this upright line cannot be cleared from the system. If it is heavy material, enough kerosene must be pumped into the system to both wash the pump and dilute material that cannot be cleared from the system. Normally, this diluted material goes back into the tank unless it is drained out.

Editor's Note: A following article will detail the tests which need to be performed on a distributor to ascertain whether it is functioning correctly and giving the desired spread.

March: One of Worst in Many States

The almost unprecedented series of blizzards which kept much of the nation snow-blanked through February and March, brought heroic action by highway crews in some states. And in a dozen or more states, the cost of snow plowing and of repairing the heavy spring damage has eaten heavily into maintenance budgets.

Virginia highway officials, declaring the last winter as the "worst in 70 years," mobilized 5,000 pieces of road equipment from the state maintenance fleet (this state maintains all classes of roads). Also thrown into the fray were 2,500 units from contractors, farmers and other equipment owners. Cities and town rounded out the mechanized attack to 10,000 machines. The state's emergency program for clearing the roads and aiding in rescue work ran to $50,000 per day, according to official estimate—three times the normal daily cost of statewide road maintenance operations on all road classes.

Missouri was another state hit hard, and hit late in the season when least expecting it. During March every man on the state highway department's 2,327-man regularly employed maintenance force was kept on duty. Also the entire roster of 623 regular part-time men, plus such additional men as could be worked in hard-hit areas.

Equipment mobilized at the peak included 1,093 trucks, many with V-plows.

Iowa's aftermath of winter and spring included severe and widespread road damage. In April the state highway commission asked the Iowa executive council for additional funds to fix up and maintain 9,690 miles of primary highways damaged by snow removal equipment and by spring thaws and rains.

The maintenance budget for the highway commission's fiscal year (ending March 31, 1960) was forcast to show substantial over-spending due to heavy use of de-icing salts and heavy plow work. The 3,400 miles of state roads selected for chemical treatment required more than double the salt tonnage anticipated.

Maintenance for the 1959-60 winter, through February 1, included $226,000 for snow fence, $551,000 for snow plowing an salted roads, and $949,000 for plowing on non-salted roads. Taking down of fence and summer equipment overhauls will bring the total winter road maintenance cost to $3¼ million, the state commission estimates.

THE MICHIGAN STATE HIGHWAY department reports that its state's roads have 111 fully-equipped roadside parks, three to five acres in size. These provide off-highway parking, and other convenient facilities.

Giving Jersey Pike's shoulders a fresh armoring to help them withstand frequent emergency wheel passage.

How Jersey Pike Uses Neoprene Modified Asphalt

Neoprene-modified asphalt is being specified for construction and maintenance of inside shoulders on the New Jersey Turnpike, according to Harold W. Goldberger, P.E., the Authority's engineer of maintenance. Two installations, 13 miles on each side, are in service between Newark and the turnpike's northern terminus.

This new use for neoprene-modified asphalt is the latest in a series of applications pioneered by the Turnpike's maintenance department. Neoprene has been used previously with asphalt emulsion to fill longitudinal cracks in the bituminous concrete pavement. Other uses with various types of asphalt include joint sealing on sections of concrete pavement and bridge decks, sealing underbridge slope protection pavement, and experimental surface treatments on the

bituminous concrete roadways to improve anti-skid qualities.

The prime reasons given for use of the material on shoulders were the improved workability, better chip retention, and lasting elasticity impart to asphalt by as little as 1½ percent of neoprene. These properties reportedly reduce bleed-through, improve traction and give better performance at high summer and low winter temperatures. The expected results are longer wear, safer roadway surfaces, and less maintenance.

To minimize interference with the Turnpike's heavy traffic, maintenance officials and their contractors confine maintenance and construction operations on its roadways to midweek days during daylight hours. The ease and rapidity with which neoprene-modified asphalt can be laid down with standard equipment, and the tenacity with which it holds stone aggregate on its surface immediately after laying, have proven important factors in meeting maintenance and construction schedules.

Cutback asphalt (RC-2 or RC-3) modified with 1½ percent neoprene by weight and heated to 150 to 200 deg. F. is applied by a standard pressure distributor. The spread averages 0.3 gal. per sq. yd. for seal coating an existing 3-in. penetration macadam shoulder, followed by chip application and rolling.

The first shoulder sealing with neoprene-modified asphalt on the pike was made in June, 1959; the second in late November.

The initial adoption of neoprene-modified asphalt by the turnpike was in 1958 as a crack filler. Using 3 percent neoprene by weight with a rapid curing filler, longitudinal cracks developing in the traffic lanes were filled, the cracks being as great as an inch wide, ¾ in. deep and 50 ft. long in some cases. The asphalt emulsion remained very fluid, pouring into place without difficulty. This procedure is presently the standard method of maintenance because of faster curing, according to Mr. Goldberger.

Crack filling is accomplished by pouring the mixture of neoprene and asphalt emulsion, Grade RS-1, into the crack and covering with a sharp, hard, manufactured stone sand. In a normal working day, the maintenance sealing crew is able to cover about one mile of 3-lane pavement. The cost is variable; a good average for labor costs, about $100 per day.

Neoprene-modified asphalt seal cover three-eighths inch aggregate, being rolled, and made ready for immediate use.

Neoprene-modified asphalt is also specified by the maintenance department for joint filling between concrete slabs. Also for sealing concrete or Belgian block pavement on under-bridge slopes adjacent to bridge abutments, where conventional sealing materials settled or washed out, allowing water to seep under.

Neoprene-modified asphalt has been supplied by Oil and Chemical Products, Inc., now the Asphalt Division of Century Chemical Corp., New York, N.Y. Whitmyer Bros., Folsom, New Jersey, the prime contractor, subbed the work to Franklin Contracting Co., Little Falls, New Jersey and to Union Building and Construction Co., Passaic. Consulting engineers for the project, representing the New Jersey Turnpike Authority, were Barnett and Herenchak, Newark, N.J. The Du Pont Company manufacturers neoprene as a basic raw material for industry.

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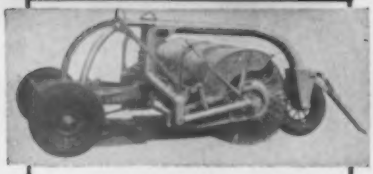

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Views And Comments

By H. G. Nevitt

Common Errors In Surface Treating

In a previous issue, we pointed out the great utility of the surface treatment as a low cost method of paving for light traffic or as the initial phase in stage construction. We echoed Dr. McLeod's views (presented before the AAPT at Memphis) that high quality in surface treatments was possible and achieved almost uniformly in some parts of the world, but that in other areas almost the converse was true.

We have had opportunity to see a considerable amount of surface treating and seal coating work in the United States and we have reached the conclusion that in many cases it could be greatly improved. It is possible to make errors of all sorts in this work, some of them not apparent or not satisfactorily to be criticized at the time of construction, but which become evident later on. Most of the mistakes made fall into a few classifications, and it may be of interest to briefly comment on these.

The first and most common error is lack of good engineering in the planning or carrying out of the work. This does not imply that the operation necessitates a highly trained engineer. We think that many men with relatively little education but considerable experience in highway construction can observe, learn, and understand the principles involved in good work. However in many agencies such attention, study, and similar consideration have apparently not been given since unsatisfactory results continue year after year.

A point which should be first made is that results which are unsatisfactory from the writer's viewpoint are often accepted as quite all right by the agency concerned. That is because the possibilities in the way of functional improvement at low cost possible from such treatments are not recognized by many highway men. Why settle for a job which merely holds the surface together and protects the base when, for practically the same cost, a non-skid surface of outstanding driving characteristics with maximum protection to the base and reinforcement to the road structure can be had? The first step in improvement of construction is therefore to know what results can be obtained by good work.

We frankly do not understand the reason for much of this lack of good engineering in seal coats and surface treatments. We have always had a high respect for the practical worker in our country. He is usually observant, intelligent and learns through trial and error how to do the best possible job. But somehow or other this does not always seem to happen in the case of seal coat work. We suspect it results from the operation being turned over to men who do not feel that the final results or engineering phase of the operation is their responsibility—while those qualified to do a good job of engineering simply fail to devote sufficient time to it to build up the experience, understanding and judgment needed.

While surface treatment does not require highly scientific engineers, it is of course true that the engi-

Continued on page 177

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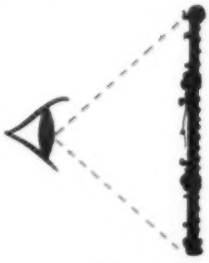

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NEVITT

Continued from page 174

neering of these pavements does involve a lot of complex elements; much study is essential to acquiring the know-how needed for the best work.

Most foremen with reasonable intelligence and experience should be sufficiently qualified, with perhaps some training or advice.

This fault of poor engineering appears in many ways. Often it results from failure to understand the reasons for poor results.

As a typical example, we can mention a job which we saw put down in the fall in one of our northern states. The asphalt quantity was insufficient to properly imbed the aggregate, and the cold nights accentuated this situation. As a result, the large size aggregate had all been knocked off by spring, when we again inspected the job with an engineer from the main office. Since with the advent of warm spring weather the remaining aggregate had become buried in the asphalt, even though this originally had been of insufficient quantity. The surface was black and shiny.

The engineer with me immediately concluded that the fault had been the use of an excessive amount of aggregate. This is a common conclusion in many situations where the original fault was quite different. To properly understand what has happened to such a project, a complete study of its design and history is essential.

The next most common fault in this type of work is the use of unsatisfactory aggregate. Often the specifications do not demand a good material, even though satisfactory cover aggregates may usually be supplied under them. And, even with good specifications and material it is possible to sufficiently increase the dust content to "kill" the asphalt, to put the aggregate on in an extremely wet condition, or otherwise to spoil the job, simply because the cover aggregate needs were not thoroughly understood and carefully provided.

The next common fault is the use of an unsatisfactory grade or type of asphalt. There are many ways to build a surface treatment or seal coat, as well as many difficulties which may be encountered. If the asphalt type or grade is not carefully selected in the light of the particular needs, a material may be used which is definitely unsuited for that project. This generally occurs as merely one example of a common fault in American highway engineering practice, which is doing everything by the book regardless of the varying local circumstances.

There is nothing that some highway departments like better than a completely standardized way of doing everything, despite the fact that nature refuses to cooperate in many cases.

A close competitor with this error is the carrying out of the operation in unsuitable weather, particularly late in the fall. A job done too early in the spring may often straighten out when summer weather appears, provided most of the aggregate has not been lost meanwhile; but late-season work done when the weather is too wet or too cold usually gets progressively worse.

Nevertheless, the favorite time for doing seal coats is in the fall. There are, of course, many situations where this is the logical time from the standpoint of other needs; but it presents the greatest threat to good results. If the surface and base will make it through the winter, all such seal coating work should be postponed to early spring, because as noted above, it is better to do it too early in the season than it is to do it too late.

Finally, we have the common error of poor traffic control, or in some cases complete lack thereof. It is simply not possible to do a good job of seal coating or surface treating if the project is turned over to modern high speed traffic almost immediately. Time is required for the asphalt binder to work up through the base, for interlock between the cover aggregate to be obtained through pneumatic rolling for a considerable period, and in general for the mat formed to work around and settle down as a result of the rolling operation. Many efforts to get around this such as by using excess aggregate to allow for some kickoff or some other ways to permit prompt use of the surface simply aggravates the problem. A good surface cannot be obtained without some time for rolling or its equivalent.

It is recognized that there are many times – a downtown city street is a good example—when there is simply not much time available for the street to be closed off to traffic. If so, specific (and often different) steps must be resorted to, to attain a surface which is near enough to its finished state to withstand traffic immediately. Usually special materials and special handling are involved, such as the use of a greatly increased amount of rolling equipment.

However, even where the surface must be turned over to traffic after a limited time, it is still possible by traffic control to hold down the speed of the vehicles to 15 miles per hour (or less) to develop interlock and avoid kickoff. In a number of cases special construction approaches, which sacrifice some of the objectives sought after in the usual seal coat, are a far better choice than conventional methods with poor results due to too early traffic.

It will be noted that all of the errors listed are really merely supplements to the first one, namely, the lack of understanding of how seal coats and surface treatments function and their engineering to make sure that a good result is obtained. We doubt if there is any one in a position of real authority in a highway agency, no matter how small the agency, who does not have the ability to learn the art of proper surface treatments. Acquiring this skill is essential, since we visualize an ultimate America in which all roads that carry even low traffic volumes will be paved in some fashion or other on the theory that if the road justifies use, it justifies paving. In such a highway program surface treatments must be an essential factor, while in the maintenance of our heavy duty and other types of pavements, where there is sufficient wear and other effects of traffic, the seal coat is the logical, simplest and most efficient type of maintenance. These operations deserve the best, but they often fail to get it.

A 3-DIMENSIONAL SCALE model showing two freeway design and location possibilities was displayed recently in a New Jersey city to help local citizens visualize the routes in connection with hearings over the final location.

The rubberized tar concrete mixture was routinely spread with a Barber-Greene paver.

Tar-Rubber Overlay Methods for Jet Aircraft Apron

By W. J. Hardy, Jr.

Arlington Asphalt Company,
Arlington, Virginia

A 47,300 square yard parking apron for jet aircraft, adjoining runway 01-19 at Andrews Air Force Base, was resurfaced in July of 1959. The material consisted of 1½-in. depth of rubberized tar concrete. Some 3,700 tons of this mix was produced and placed by Arlington Asphalt Company, with supply from the company's plant at Arlington 20 mile away.

Upon being awarded contract AF-49 (642) 207, the Arlington Asphalt Company commissioned Froehling and Robertson of Richmond, Va., consultants, to design the resurfacing mix. This firm after testing various blends of available aggregates submitted a design mix that was subsequently approved by Robert Starkey and C. R. Dillon of Installations Engineering, at Andrews AFB.

The mix was based on the use of Virginia No. 9 (¾ in.) trap rock and trap rock screenings. These aggregates were shipped by rail to the contractor's plant where they were combined with river sand. The tar-rubber binder was shipped by tank car from the Garwood, N. J., plant of Koppers Company, Inc.

The job mix—based on results of Marshall tests—was set up as follows:

30% ¾-in. trap rock
50% trap rock screenings
20% building sand

Continued on page 181

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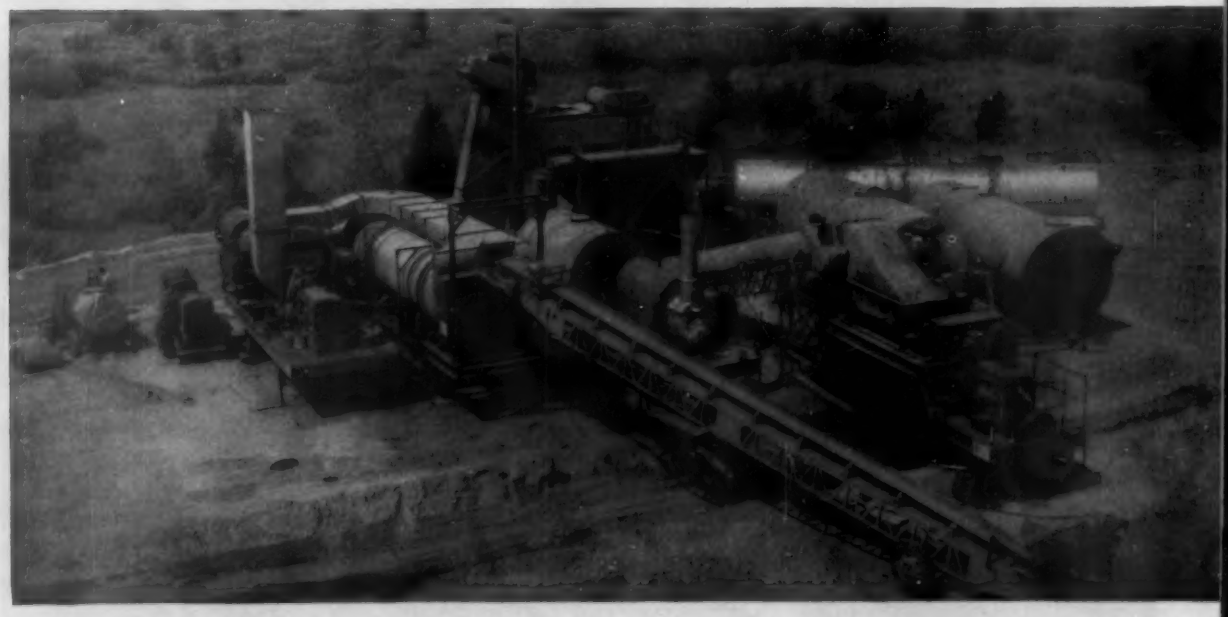

Owners Say: *"We can move, set up, and be running again in 3 days — instead of a week"*

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As one owner says: "With our other plants it takes a full week to move and set up again. With our H & B Mobile Plant we can move, set up and be running again in 3 days." In other words, 3 days that would otherwise be spent in moving can now be used for production.

Another Mobile Plant owner says: "We have cut moving costs by approximately 70%—and increased our production by approximately the same —70%."

For further information see your H & B distributor or write direct.

HETHERINGTON & BERNER INC. • 701-45 Kentucky Ave., Indianapolis 7, Ind.

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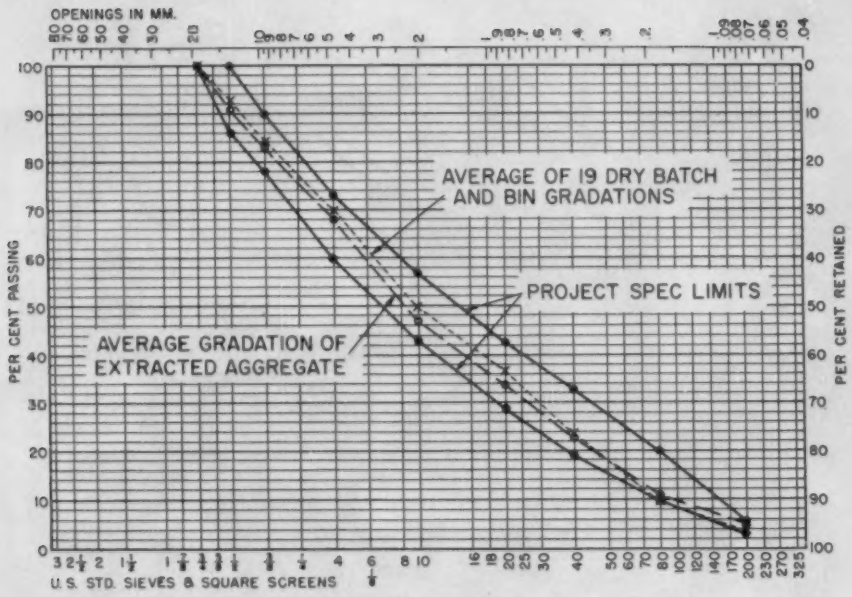
H&B ESTABLISHED 1907

Also builders of the newly designed Series B batch mix plants with batch capacities from 2,000 to 8,000 lbs., and Moto-Paver, the combination traveling mixer-paver that does the complete mixing and paving job in one continuous operation.

. . . for more details circle 324 on enclosed return postal card


OPENINGS IN MM.
AVERAGE OF 19 DRY BATCH AND BIN GRADATIONS
PROJECT SPEC LIMITS
AVERAGE GRADATION OF EXTRACTED AGGREGATE
PER CENT PASSING
PER CENT RETAINED
U.S. STD. SIEVES & SQUARE SCREENS

Gradation data for rubberized tar concrete at Andrews Air Force Base.

TAR-RUBBER OVERLAY

Continued from page 178

The aggregate gradation was designed to meet the ¾ in. top size grading band as given in the Corps of Engineers specification for Hot Laid, Rubberized Tar Concrete Pavement—CE 807.12 (see chart).

A two-ton batch-type Cummer plant was used for producing the tar-rubber resurfacing mix. The cold feed end was equipped with two reciprocating feeders that proportioned raw aggregates from the two-component cold aggregate storage bin. Since three aggregates were used in the mix, it was necessary to preportion the two fine aggregates (trap rock screenings and building sand) into a single stockpile prior to delivery to the fine aggregate feeder bin. The blend of 2 parts screenings to 1 part sand was varied at times, depending upon results of gradation tests taken from the plant fines bin. Fine aggregate pre-blend and coarse aggregate (¾-in. trap rock) were delivered by truck from their respective stockpiles to the two cold aggregate storage (feeder) bins.

The plant dryer was a typical cold mix type. It was fitted with two burners that used No. 4 fuel oil. One burner was situated at the outlet end, while the other enclosed the center portion of the dryer in an oven-type arrangement that heated the outer shell. After leaving the dryer at 240-260° F, the aggregate mixture was screened into three hot aggregate storage bins —¾" to ⅜", ⅜" to No. 4, and minus No. 4 mesh. Bin samples were then obtained for gradation analysis. Based on these gradings, the mix formula here tabulated was set for a 4,000-lb. batch of rubberized tar concrete.

Mixed Formula For Rubberized Tar Concrete

Bin	Nominal Size	Aggregate	Binder & Aggr.	Weight (lbs.)
No. 3	¾" - ⅜"	20%	18.63%	745
No. 2	⅜" - No. 4	25%	23.12%	925
No. 1	Minus No. 4	55%	51.00%	2,040
Rubberized Tar Cement		—	7.25%	290

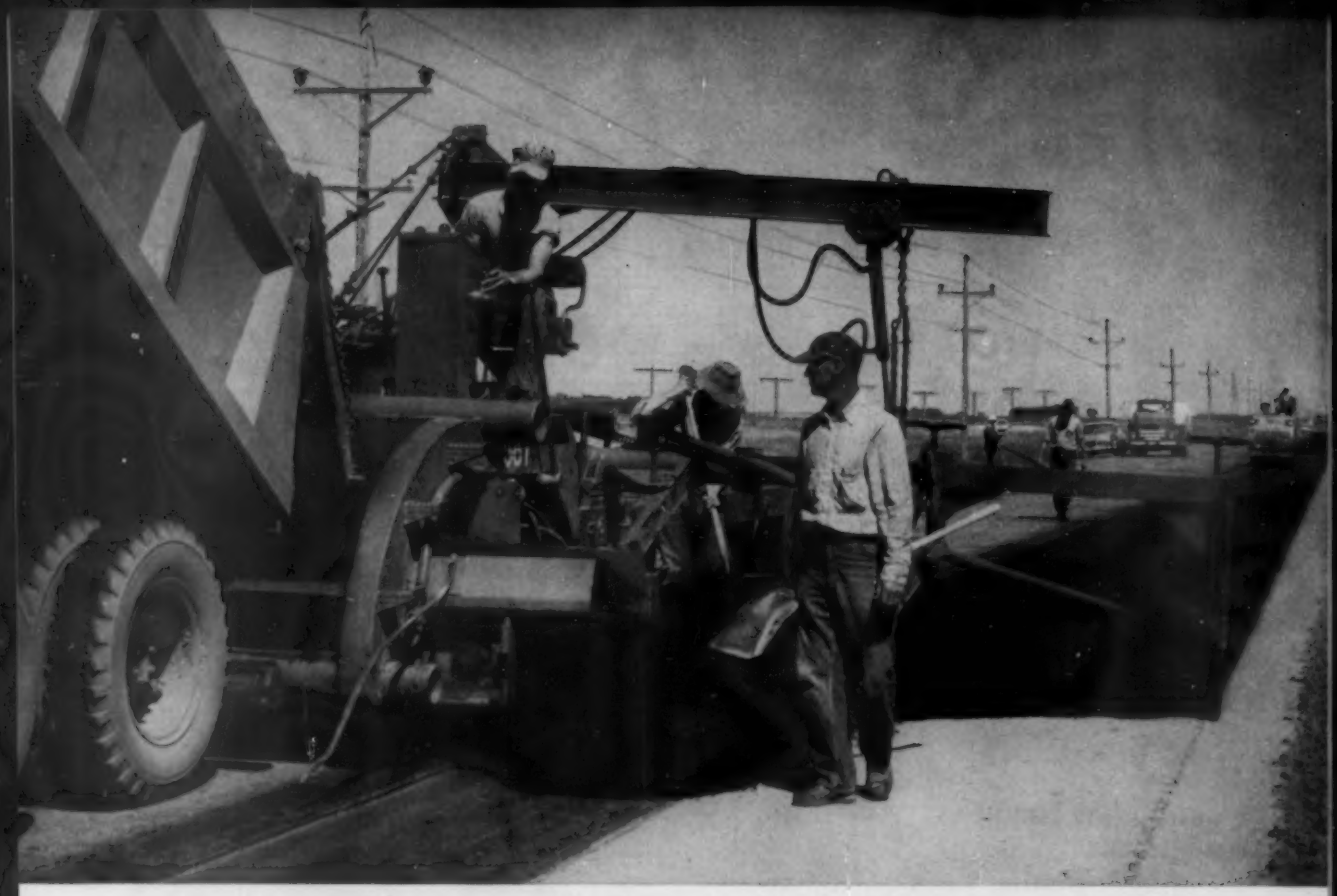
The rubberized tar cement was produced to meet the Corps of Engineers Guide Specification—Tar-Rubber Blend for use as Binding Agent in Hot Mix Tar-Rubber Pavement (June, 1956). Upon arrival each tank car was heated to about 220° F, then pumped into the storage tank that supplied the mixer. After the correct amount of each bin size aggregate (215-235°F) was weighed and charged to the mixer box, the rubberized tar was weighed into the tar bucket at a temperature of 225-250°F. It was then discharged into the mixer to produce the rubberized tar concrete.

Four two-ton batches were loaded into each truck. Immediately after being loaded, each truck was weighed, the mix temperature (220±5°F) checked by an Air Force inspector, a canvas cover placed over the mix, and the truck dispatched to the job.

The asphaltic concrete pavement over which the rubberized tar concrete mix was to be applied was seven years old. A few years ago, it was sealed with a single application of coal tar pitch emulsion. Much of this seal had been worn away by subsequent traffic. Prior to arrival of the tar-rubber mix, this surface was swept with a power broom to remove all foreign matter. It was then tack-coated with a hand-hose applied 'fog-coat' of 0.1 gal./sq. yd. of tar grade RT-4.

Over this tack coat (at least 24 hours later) the mix was spread

Continued on page 184



Five contractors each bought a Barber-Greene Road Widener and Shoulder Paver after seeing W. Hodgeman and Sons' machine perform on this 20-mile widening and resurfacing contract on U. S. 212 near Birds Island, Minn. General Supt., George McPherson states: "The Barber-Greene is the only rig that could have met state specs on both 9-ft. base widening and 6-ft. shoulder paving at speeds to 70 fpm. We laid the base course of emulsified asphalt using the hydraulically controlled strike-off attachment. On the last pass where pre-compaction and automatic leveling were required, we changed to our tamping-leveling attachment. On the 6-ft. wide and 2½" thick finish course we averaged better than 200 tons of hot mix hourly. This is the first time we've been able to handle this type job with one machine."

See your Barber-Greene Distributor for details on the only machine with interchangeable attachments for handling all types of widening and shoulder paving with all materials, including concrete. And check how much more you can earn with a machine featuring: NEW 2-UNIT DESIGN—greater stability with trailer-mounted attachments eliminates side drag steering problems; UNMATCHED PORTABILITY—10 mph under own power, or truck towed on its own trailer; and HYDRAULIC CONTROLS—on strike-off attachment that is adjustable while paving...hydraulic steering, jib hoist, self-cleaning hopper, and brakes. Hopper conveyor hydraulically controlled for both speed and position.

"ONLY WIDENER THAT COULD MEET STATE SPECS— PAVED SHOULDERS AT 70 FPM"

Versatile SJ-50 Road Widener and Shoulder Paver is shown improving traffic conditions on narrow road near Savanna, Ill., by making one-pass operation of laying 6-ft. concrete shoulder with exclusive vibrating concrete attachment.

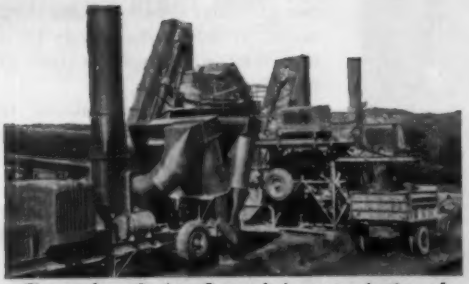
SJ-50 paves 6-ft. asphalt shoulder around tight curve near Cheyenne, Wyo., without slowdown. Exclusive attachment, utilizing tamping-leveling principle with compaction before strike-off, assures finest work.

873 FINISHER—For all contractors with variety of scattered jobs who need extreme mobility. Paves on tracks, travels on rubber.

879-B FINISHER—Universal machine for contractors wanting greatest job range from a single machine.

SB-60 FINISHER—The ultimate in heavy-duty, high speed, high capacity, low maintenance asphalt paving. Offers highest production and lowest cost per ton mile. SA-60 crawler-mounted, SB-60 is pneumatic tired.

CONTRACTOR-PREFERRED FINISHER LINE



Choose from Barber-Greene's largest selection of 17 continuous and batch-type mix plants to complete the most profitable paving package available.

World's No. 1 Manufacturer of Asphalt Paving Equipment

Representatives in Principal Cities of the World

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Main Office and Plant AURORA, ILLINOIS, U. S. A.

Plants in DeKalb, Illinois..Detroit..Canada..England..Brazil..Australia

CONVEYORS • LOADERS • DITCHERS • ASPHALT PAVING EQUIPMENT

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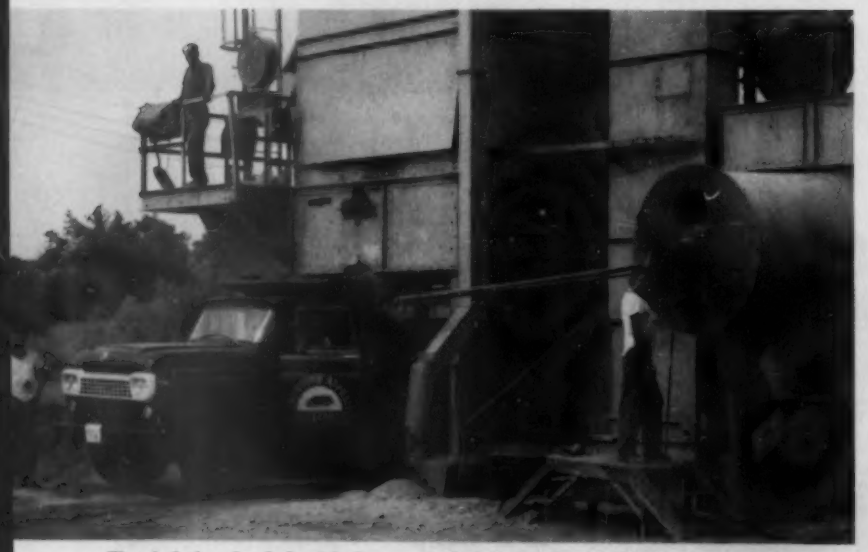
Arlington Asphalt Company's Cummer 2-ton batch cold mix plant.



Truck being loaded with 8 tons (4 batches) of rubberized tar concrete resurfacing mix.

The break-down roller stayed close to the paver. Joint was compacted while still warm. Raking was kept to a minimum, since the tar-rubber mixture 'set' quickly.

TAR-RUBBER OVERLAY

Continued from page 181

through a Barber-Greene paver at about 215° F. Compaction was done with two Buffalo-Springfield steel-wheel tandem rollers. Rolling could not be delayed because of the quick 'set' of the tar-rubber mixture. Because of this circumstance, raking was kept to a minimum throughout the progress of the job.

In order to form a satisfactory joint between the rubberized tar overlay and the adjoining portland cement concrete pavement, a wedge-shaped section—approximately 3 ft. wide by 2 to 4 in. deep—was cut from the old asphaltic pavement abutting the edge of the pcc runway. This 'cut' was filled to grade with fresh plant mix, compacted in layers. Later it was overlaid with the rubberized tar concrete resurfacing mix.

Core samples of the finished pavement were obtained periodically for analysis by the consulting engineers. The mix plant operations were followed throughout by A. J. Wise of Koppers Company, Inc. In addition this supplier furnished personnel to follow field laying operations.

Construction proceeded only during dry weather. The job was delayed several times by rain, ample drying time always being allowed before paving was resumed.

Air Force inspectors insisted that all cracks in the old pavement be purged with air to remove any excess moisture, prior to re-starting paving.

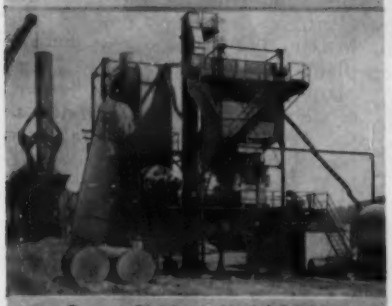
Careful check was made of the average mix gradation as determined from plant storage bin samples taken at the job site. These two gradings are in very good agreement. In addition, they fall within the narrow job specification grading limits.

Early in October—about three months after the overlay had been placed—the surface was sealed by two applications (0.1 gal. per sq. yd. each) of coal tar pitch emulsion. The seal was applied by personnel of the Arlington Asphalt Company. Thus, double protection was afforded against the softening effect of any jet fuel spillage.

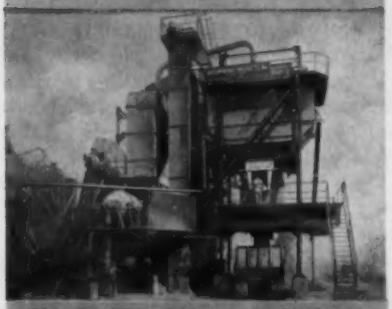
This project, located as it was

Continued on page 186

Asphalt Products Company's Model S-80, the sixth Simplicity bought by Dick Shorts of Youngstown, Ohio.



Barrett Division's Model S-100 at Cincinnati, Ohio.
This is Barrett's fifth Simplicity.



Model S-200 of Bituminous Products, Buffalo, N. Y., their fourth Simplicity.

There's a
SIMPLICITY PLANT NEAR YOU
On request, we'll be glad to send you the name and location of a nearby installation.

FACTS vs ARGUMENTS

Get the FACTS and NOT THE BULL on two important points before you buy any asphalt plant. The outstanding success of the Simplicity S-200 has caused claims (verbal) that our S-200 is our S-100 speeded up. Here are the FACTS:

Model	S-80	S-100	S-200
Rated Capacity (T.P.H.)	75 to 100	100 to 150	150 to 200
Dryer Volume (Cubic Ft.)	603	1,018	1,571
Dryer Speed (R.P.M.)	12	11	9
Air Volume (C.F.M.)	30,000	35,000	40,000
Fan Speed (R.P.M.)	900	800	800
Screen Area (Sq. Ft.)	96	140	180
Screen Speed (R.P.M.)	800	800	800
Bin Capacity (Tons)	50	50	85
Weighing Capacity (Lbs.)	6,000	7,500	10,000
Mixer Capacity (Lbs.)	5,000	6,000	8,000
Mixer Volume**	50.63	65.6	93.1
Mixer Speed (R.P.M.)	56	50	45
Total Weight	187,385	228,865	262,535
Total Price*	$94,500.00	$116,400.00	$132,800.00
Price Per Pound	.504	.508	.505

* Prices subject to change without notice. ** Cu. Ft. Below Shafts.

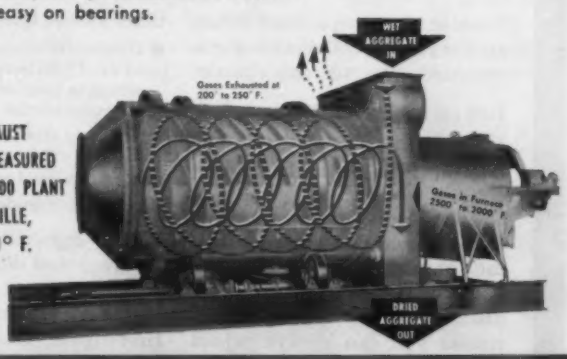
(No price increase for more than a year.)

The only Dryer that starts at once without "warming up" . . . stops immediately without "cooling down"! Aggregates exposed to hot gases for twice the length of time. Aggregates placed in path of hot gases by cross showering.

Fuel bills are lowered 30% or more and any mechanic knows a horizontal Dryer is easier to operate and keep in top condition . . . takes less power, is easy on bearings.

RED LINES show flow of aggregates through outer and inner shells. Hot gases in inner shell are INSULATED and ABSORBED by cold wet material in outer shell.

ACTUAL EXHAUST TEMPERATURES MEASURED JUNE 1959 ON S-200 PLANT AT DOUGLASVILLE, GEORGIA--180° F.



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FROM BUILDER TO BUYER BETWEEN MEN WHO KNOW

THE SIMPLICITY SYSTEM CO.
SHOLAR AVENUE PHONE MAdison 2-2144
CHATTANOOGA 6, TENNESSEE

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Case of the Smelly Asphalt Plant

The Plas Construction Company of Elyria, Ohio, had made application to the village of Strongsville, Ohio, to erect an asphalt plant on an industrial zoned site. As told by a spokesman of Colonial Iron Works, the plant was specified to be one of their Bollard plants. At a public hearing, the aroused citizenry stormed the tiny city hall armed with reasons for denying the construction, one complaint being that the plant would emit odors.

While Strongsville's people were shouting about odors, the members of the Board of Appeals of Southfield Township, Oakland County, Michigan, were visiting the Bollard plant built for the Bedford Heights Asphalt Company, Bedford Heights, Ohio. The board members stood upwind, downwind and crosswind and sniffed. They listened for noise and checked the stack at the plant. The reason for their visit was to see a Bollard plant in operation since the Hydraulic Concrete Breaking Company of Oak Park was seeking a permit to erect a Bollard batch plant in Southfield Township.

Back at Southfield Township, the board reported that there were no odors, that a truck raised more dust than is emitted from the stack, that they could not hear noise from the plant even on the downwind side, but that they *did* hear a bulldozer a quarter of a mile distant!

The Plas Construction Company decided that rather than fight an irate citizenry, it would build its plant elsewhere.

Meanwhile the Board of Appeals at Southfield Township approved the application of the Hydraulic Concrete Breaking Company and in Item 6 of its decision said, "The plant is to be an asphalt 'batch' plant as manufactured by Bollard of Cleveland, Ohio, and similar to the 120-ton per hour installation owned by Mike Vitale, in Cleveland, Ohio, inspected by the Board of Appeals."

NBCA Summer Meet

The midyear meeting of the National Bituminous Concrete Association will be held July 17-20 at the Concord Hotel, Kiamesha Lake, N. Y., NBCA President Bryant M. Collins of Austin, Tex., has announced. Decision on the location for the association's new research headquarters is expected at this meeting.

TAR-RUBBER OVERLAY

Continued from page 184

on the outskirts of Washington, D. C., was visited by many engineers during the resurfacing operations. Personnel from various branches of the Air Force, Corps of Engineers, Bureau of Public Roads, and others were on hand to watch the laying and compaction of the tar-rubber resurfacing course. Close watch will continue to see how the pavement behaves under traffic. Based on laboratory test results furnished by Koppers Company, and the care taken to assure that the mix was produced at the proper temperature without any chance of overheating (maximum 230°F), it appears that very good service life should be expected. The pavement appeared highly satisfactory when resurfacing was completed, and also prior to the application of the seal coat three months later.

Accurate...Dependable...Economical

PLUS PAYLOAD BONUS!

Look at these capacities! When an Etnyre FX-500 distributor is mounted on a tilt cab chassis:

1500 gal to meet 18,000 lb axle limit
1760 gal to meet 20,000 lb axle limit
2100 gal to meet 22,400 lb axle limit

Similar increased maximums on semi-trailers and tandem axle mountings. And dependable operation . . . uniform, accurate distribution are typical of the results you can always expect from an Etnyre. No-streak spraying with clean, sharp edges is insured by Etnyre's exclusive triple-lap nozzle coverage.

Other FX-500 Quality Features:

- Hardened aluminum jacketing over 2" Fiberglas insulation which is reinforced with molded asbestos blocks.
- Stainless steel jacket near burners and exhaust stacks.
- Stainless steel pump heat jacket.
- Aluminum fenders and mud flaps.

You're familiar with Etnyre's accuracy and dependability . . . now you can get maximum payload too . . . for maximum profit. Investigate today — find out how a "Black-Topper" can handle more work, faster, better, more economically. Write E. D. Etnyre & Co., Oregon, Illinois.

SEE YOUR ETNYRE DEALER

ETNYRE
BITUMINOUS DISTRIBUTORS

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Electrically heated 4,500-gal. tank trailer combines storage, transportation and heating of asphalt coating.

Asphalt Trailer Doubles as Hot Storage Tank

An over-the-road tank trailer equipped with tubular electric resistance heating elements has been developed which is of interest to asphalt plant owners as well as refinery people. The idea offers possibilities for situations where a transport can serve economically for brief periods as a stationary tank, in lieu of unloading into storage tanks.

The trailer was fitted out by Hynes Electric Heating Co. for the plant of Empire State Culvert Co., a large user of asphalt for coating its corrugated culvert pipe. Hynes designed and produced special tubular heaters for a 4,500-gal. tank trailer, working in conjunction with the tank manufacturer, E. D. Etnyre Co. The tank trailer is insulated with 4 in. of foamglass.

Two of the heating elements have immersed lengths of 30'6" and two are 16'6". The four have a capacity of 45 KW. The shorter tubes in the bottom heat relatively small volumes of asphalt, when the fluid level falls below the longer heater tubes. The short tubes are also used for maintenance purposes.

Asphalt is loaded at the refinery at 350° to 450° F, the additional heater capacity being available to bring the contents up to thermostatically controlled operating temperature upon arrival at the culvert factory. Utility power is supplied through simple plug-type connectors.

The heater tubes can be entirely removed when cleaning the interior of the trailer when necessary. The heating elements can also be removed from their tubes without draining the tank or disturbing the insulation.

Force-Account Law OK'd in Kentucky

A tightened force-account bill, permitting the Kentucky department of highways to use its own forces without taking competitive bids on road construction projects costing no more than $12,000, was passed by the Kentucky legislature and sent to the governor for expected signature.

Under the measure, an exception is made in the case of emergency repairs. Opponents argued that it was a tool for political advantage, allowing the administration in power to hire large numbers of workers near election time on various force-account projects.

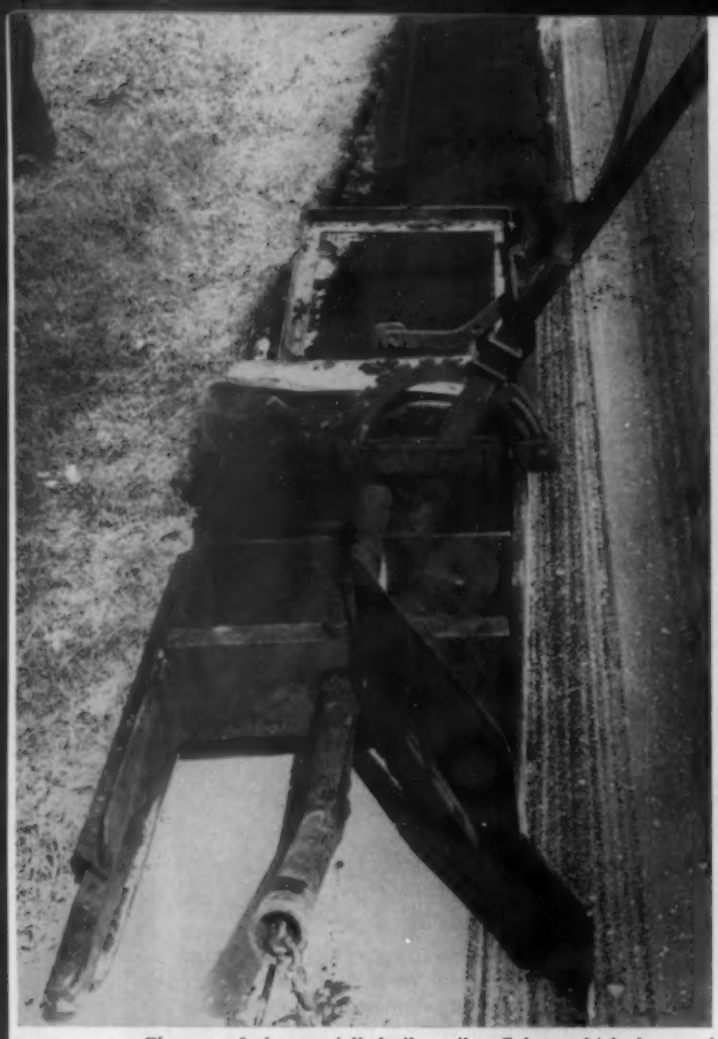
Both Governor Combs and state highway commissioner Earle Clements were credited with pledging repeal of the law during the 1959 primary campaign. (The governor since changed his mind.)

Accident Booklet

"You and the Cost of Highway Accidents" is the title of a pictorial booklet recently published by the Utah state road commission as part of its public relations effort.

Widely disseminated through the mail and in response to inquiries, this booklet with 32 pages of easy-to-read graphs and data impresses on the reader the high economic cost of traffic accidents, and presents rather startling new information on accidents involving younger people.

Readers desiring a copy should write the Utah State Road Commission, Highway Planning Division, 525 W. 13th South, Salt Lake City, Utah.



Closeup of the specially-built strike-off box which is towed along, designed to spread mix uniformly in a prepared trench along the pavement edge.

Applying a bituminous seal over a widening strip—one variation of procedure used.

The hot-mix patching unit in action followed by the spreader which leaves a 22 in. wide layer of mix ready to roll.

Drag Box Places Bituminous Edge Strip

Narrow widening strips 22 in. wide were prescribed recently for a section of highway in Samson county, North Carolina, as part of the state's secondary highway program.

How to place these strips consisting of bituminous mix, mechanically and with good uniformity, was a problem requiring the attention of maintenance engineer B. W. Davis of the North Carolina state highway department.

The result was the devising of a special strike-off spreader which worked in conjunction with the patch mixer used.

The hot patch mixer and the spreader were pulled one behind the other, using a two-ton dump truck. The forward machine produced the hot mix recommended for this type of construction. The strike-off machine laid the mix out in the prepared trench ready for rolling, as shown in the accompanying pictures.

The spreader was made from 8-in. drag blades, similar to devices used in other state divisions. The unit involves a "cap hole" at the outside of the rear-strike-off for placing

Continued on page 190

Why Big Pioneer Batch Plant lets you submit lower bids

(and make more profit, too!)

Fully automatic controls with an interlocking timer give this new PIONEER AUTO-batch* bituminous plant up to 15% greater output per day *than any other similarly rated plant* you can buy!

More batches a day

This is because instant-acting twin gates discharge the 6000 to 7500 lb. batch in as little as 3 seconds, thus permitting this new all-electric plant to deliver many more batches a day than ever before possible... *and with less segregation.*

If you wish, you may quickly change the plant to "semi-automatic" and still enjoy the benefits of automatic timing for dry and wet mixing cycles. In this case, other sequences (weighing of material, etc.) are manually controlled. The plant can also be changed back to fully-automatic without difficulty.

You may also set your AUTO-batch plant for 2 different mixes, then switch from one to the other with no loss of time.

Another time-saving innovation is the built-in power operated sampling device which makes it easy to take accurate samples of all aggregates at the same time.

Hot-bin gates, weigh hopper gate, pugmill discharge gate, asphalt bucket, as well as asphalt fill and discharge valves are all controlled by instant-acting air cylinders. These cylinders, in turn, are actuated by electric solenoids.

The PIONEER AUTO-batch plant consists of two semi-portable units. The Drier Unit includes multiclone dust collector (most efficient of all mechanical types) mounted together with the drier on a single chassis.

The Tower Unit is of unitized construction to permit easy stacking assembly. The separate screening, weighing, and mixing sections are assembled at the factory as complete, integrated units including wiring and piping. Each of these units can be low-boy loaded . . . or weighing and mixing units can be fitted with wheels for fifth-wheel towing.

If your future plans call for bituminous work, it will pay you to learn how the new AUTO-batch plant will enable you to submit lower bids . . . and at the same time, help you make a nice profit. *TRADE MARK

OTHER MEMBERS OF THE PIONEER BITUMINOUS TEAM

PIONEER Continuous Mix Plant

PIONEER *VIBROmatic* Bituminous Paver

Pioneer®
EQUIPMENT

Manufactured by Pioneer Engineering, Division of Poor & Company, Inc., Minneapolis, Minnesota

PORTABLE CRUSHING PLANTS | WASHING PLANTS | STATIONARY QUARRY PLANTS | BITUMINOUS MIXING PLANTS | BITUMINOUS PAVERS

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DRAG BOX PLACES STRIP

Continued from page 188

extra material when needed at the pavement edge. The lever shown is for raising the rear strike-off blade, and there is a lever with a sextant for steering.

The bituminous strip is designed to serve several purposes. It provides a widened road bed for handling increased traffic volumes. It serves to confine the pavement edge and strengthen it. One way or another it serves as "Preventive Medicine" on many of the roads, according to the North Carolina officials. Some of the time a sand-asphalt mix prepared in advance and placed cold, is used. Other times, the hot-mix is produced immediately ahead of the spreader as shown.

Roadbuilding Era Vital to National Expansion

A brief but eloquent summing up of the importance of an adequate highway building program to the nation comes from John A. Volpe, of the John A. Volpe Construction Co., Malden, Massachusetts, who is president of the Associated General Contractors of America:

"For the continued advancement of construction, and of the economy as a whole, I consider the expanded federal-aid highway program one of the strongest and most wholesome of all factors. As former interim Federal Highway Administrator, I saw the energizing effect of new and better highways—sometimes just the plans for new and better highways—on the areas involved.

"The total effect of highway modernization on the American economy may be likened to the effect which the building of the railroads had in the last century. It means a vast amount of both public and private investment, which provides a great stimulus to economic growth and development in general."

STANDARD STEEL "S-J"
Maintenance Distributor

DOES THE WORK OF BIG EQUIPMENT ON SECONDARY JOBS FOR LOWER COST

FULL CIRCULATING SPRAY BAR UP TO 12 FOOT LENGTH SEALS COATS AS PERFECTLY AS A FULL FLEDGED HEAVY DUTY PRESSURE DISTRIBUTOR

Standard Steel S-J Maintenance Distributor is available in either trailer or truck mounted type . . . the trailer unit can be quickly converted to truck mounting by removing tongue and running gear. A fuel pump throw out clutch is standard equipment on all models. The clutch disconnects the pump from engine when burners are not being used. The pump and piping provide the following features: (1) Pumps from tank through spray bar (2) Pumps from tank to hand spray (3) Pumps from tank to outside source (4) Pumps from outside source to another outside source (5) Pumps from outside source into tank. This versatility is a very great help in speeding operation of the S-J. Entire pump and piping as well as spray bar can be easily cleaned through its special suck back feature. Write for complete details on Model S-J.

OTHER PRODUCTS OF STANDARD STEEL
ASPHALT DISTRIBUTORS . . . BURNERS . . . POWER AND TRACTION DRIVEN CONSTRUCTION BROOMS . . . MAINTENANCE DISTRIBUTORS . . . TAR KETTLES . . . AGGREGATE SPREADERS STREET FLUSHERS . . . PIPE LINE EQUIPMENT . . . SUPPLY TANKS SHELVING HARDWARE . . . AND AGRICULTURAL EQUIPMENT

Built to the Highest Standard

Standard Steel Works, Inc. NORTH KANSAS CITY, MO. S-J 8

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Toll Road Contractor's Claim Negotiated

The Indiana Toll Road Commission has settled by negotiation a $568,000 contractor's claim for $75,000.

The claim was entered against the commission by a joint venture of two contractors, Louis Garavaglia of Centerline, Michigan, and Kenny Construction Company of Skokie, Illinois, who built a $7,700,000 section of the Northern Indiana Toll Road in Lake County. The contractors contended the extra amount was due for work done in addition to that provided in the contract specifications. The commission held the amount of the claim was excessive and counter-offered to settle for $69,800 which was rejected prior to today's settlement.

The toll road section built by the Garavaglia-Kenny joint venture involved construction of the second longest bridge on the superhighway, crossing so-called "pipeline alley" in Hammond which feeds the high refining industry in that area.

Court Decisions for Contractors

Limited Arbitration

Under a contract made with the Pennsylvania Turnpike Commission for the construction of a portion of that highway the Badgett Mine Stripping Corporation submitted to the chief engineer of the Commission a claim for additional compensation for $1,043,287.29. When the claim was denied suit was brought by the contractor and opposed by the Commission under a stipulation in the contract that was in part, "Measurement and Payment. Arbitration. Neither the contractor nor the surety shall be entitled to present any claim or claims to the Commission or to the chief engineer of the Commission * * * for additional compensation for any work performed * * * provided that the contractor or his surety shall not be denied the right to present any claim which is based on differences in measurement or errors in computations which were not disclosed until preparation of the final certificate."

Under a statute in that state, if any suit is brought on any issue referrable to arbitration under an agreement in writing to that effect, the court on the application of either party may stay such action until such arbitration has been had.

Under this statute the Commission asked that this suit be stayed on the ground that no application for submission of this claim to arbitration had been made. Denial by the court of this stay sought by the Commission was based on a ruling that had been made in an earlier case.

"Provisions in contracts," the court said in that instance, "which give engineers or architects or heads of municipal or state departments power to decide questions are not arbitration proceedings in the sense that the Arbitration Act provides. Boards of arbitration under that Act are judicial bodies. Individuals given the right in their own favor or in favor of the person who employs them, cannot be said to be exercising a judicial function at law. They exercise a power given them by the contract to decide, not to judicially hear and determine."

Badgett Mine Strip Corp. v. Pennsylvania Turnpike Com'n., 173 F.S. 425, May 29, 1925

State Court Without Jurisdiction

That it had no authority to grant an injunction against a strike and the attendant picketing by a local of the Brotherhood of Carpenters and Joiners of America, AFL-CIO, was held by the Michigan Supreme Court.

In ordering the dismissal of an action brought by a contractor engaged in the construction of U.S.-12 in Calhoun and Jackson Counties in that state, the court said, We conclude that we are without power or jurisdiction to deal with unfair labor charges within the jurisdiction of the NLRB."

Davidson v. Michigan State Carpenters Council, 97 N.W. 2nd 11, Michigan, June 6, 1959

Damages for Delay

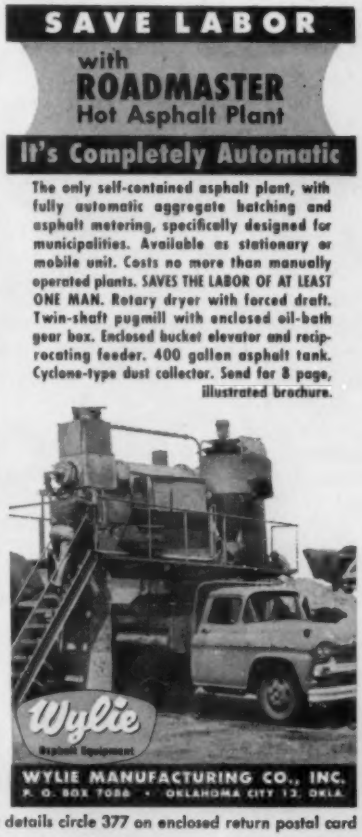
Work under a contract with the United States for the construction of roads at the Glasgow Air Force Base in Montana had been subcontracted, the subcontractor agreeing to furnish all labor and material, to gether with equipment and supplies.

Upon receipt of notice from the general contractor directing that the work be commenced on July 11th the subcontractor moved its equipment, supplies and laborers from Sheridan, Wyoming, to the site of the air base. For two months the subcontractor waited, unable to commence this work although forced to maintain in readiness for performance its machinery and equipment. The delay was occasioned by the general contractor's failure to perform the portion of the work it had assumed on this project within the time allotted.

In awarding damages to the subcontractor for the loss suffered through this delay in an action against the general contractor, the court said the following:

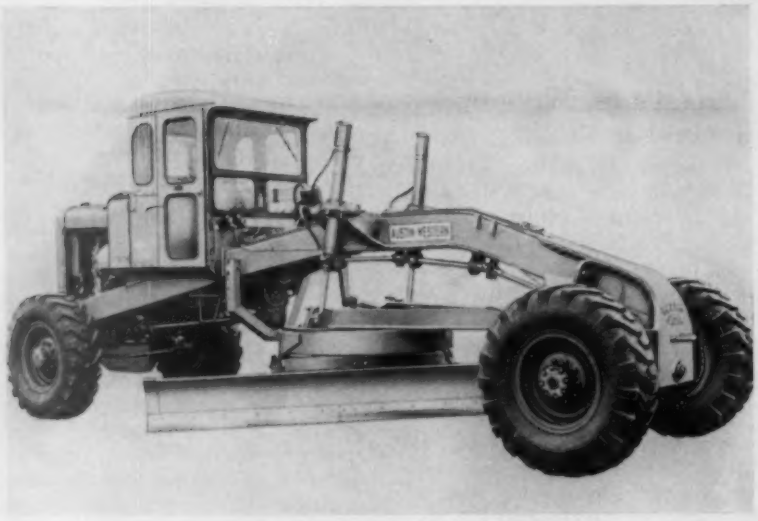
"The general rule therefore applies that where labor and material are to be furnished and rendered by the one party and to be paid for by the other and the one furnishing the work, labor and material is depending to some extent upon the other party performing his part or providing for the prompt performance by others of a portion of the work, there arises by implication an obligation on such person not only to refrain from doing that which will interfere or impede the contractor in the performance of his part but that it will also do all that which is reasonably necessary in order to enable the contracting party to so perform. For a failure in either respect damages can be properly awarded to the person so delayed or impeded."

(Studer v. Rasmussen, 344 Pac. 2d 990, Wyoming, October 20, 1959)


SAVE LABOR
with
ROADMASTER
Hot Asphalt Plant
It's Completely Automatic
The only self-contained asphalt plant, with fully automatic aggregate batching and asphalt metering, specifically designed for municipalities. Available as stationary or mobile unit. Costs no more than manually operated plants. SAVES THE LABOR OF AT LEAST ONE MAN. Rotary dryer with forced draft. Twin-shaft pugmill with enclosed oil-bath gear box. Enclosed bucket elevator and reciprocating feeder. 400 gallon asphalt tank. Cyclone-type dust collector. Send for 8 page, illustrated brochure.
Wylie
Asphalt Equipment
WYLIE MANUFACTURING CO., INC.
P. O. BOX 7026 • OKLAHOMA CITY 12, OKLA.
. . . for more details circle 377 on enclosed return postal card

NEW PRODUCTS

Listed here are reviews of new and improved equipment items, selected to aid our readers in purchasing. See reader service numbers on enclosed postcard.*



Austin-Western Pacer-400

New Power Graders

The new Pacer-400 power graders with 143-hp engines are both in the heavyweight 30,000 lb. class. Both are available from Austin-Western, Construction Equipment Division of Baldwin-Lima-Hamilton Corporation.

Both the four-wheel Pacer-400 and the six-wheel Super-400 feature power drive at all wheels; power steering at front and rear; power blade controls; power attachments which include scarifier, bulldozer, roller, V-plow, reversible plow and snow wing; power transmission; power shift and power reverse. All wheel drive provides full traction ahead of the blade as well as behind it, giving the graders maximum pounds of pull, the maker states. Choice of engines includes Cummins C-160 6-cyl. diesel engine or GMC-471 4-cyl. diesel engine; both are 143 hp.

Advertising Manager, Austin-Western Works, Baldwin-Lima-Hamilton Corporation, Box 124, Aurora, Ill.

For more details circle 101 on Enclosed Return Postal Card.

Combined Breaker-Impeller

A newly-designed Cedarapids Model 3645 portable double impeller impact breaker with Simplicity Grizzly feeder has been announced by the Iowa Manufacturing Company.

The addition of the feeder to the impact breaker combines into one compact unit, a grizzly to by-pass fines and undersize material and a feeder to assure positive uniform flow of material, allowing only material requiring primary reduction to pass into the breaker chamber. The unit eliminates a separate feeder and grizzly, providing a reduction in weight and loading height. The grizzly feeder is designed to prevent rock from jamming, and a vibrating unit keeps the rock in constant forward motion at all times at a uniform rate. Rock does not pile up to slow production, the manufacturer states. Impact bars are placed to absorb loading shock and easily replaceable liners are said to reduce wear to the feeder body. Coil spring mounting confines vibration to the feeder. This type of feeder is designed to be especially suitable for material with low silica content.

Iowa Manufacturing Company, Cedar Rapids, Iowa.

For more details circle 102 on Enclosed Return Postal Card.

Earth Compaction Unit

A new earth compaction unit, the DW20A Compactor, has been announced by Hyster Company's Tractor Equipment Division.

Compaction wheels are designed for effective operation at high speeds in all classes of soil and rock fill material at speeds up to 15 mph. This results in consistent production rates of 1,200 cu. yd. per hr., the manufacturer states. The unit is available with interchangeable

Cedarapids 3645 Breaker

*To readers outside of the United States--postal rules forbid use of business reply cards outside of the U.S. Please write to us listing the numbers, month and name of magazine, and mail with your name and address to Inquiry Dept., Roads and Streets, 22 W. Maple St., Chicago 10, Ill., U.S.A.

New PYRALUX

TRADEMARK

FLUORESCENT ENAMEL

multiplies "see power"

"I didn't see it in time," are common words after an accident. That's why Du Pont now offers operators of highway construction equipment a brilliant new answer to danger situations involving visibility —PYRALUX, a hyper-intense fluorescent enamel that reflects up to four times as much light energy as conventional (ordinary) colors of the same hue.

From every operational viewpoint, high-visibility PYRALUX helps reduce accidents and their costly results. Use on aircraft and truck fleets has already proven this great safety potential.

The standout shades of PYRALUX retain their vivid color identity even at great distances . . . a terrific advantage where speeding cars overtake heavier, slow-moving units going to or from a job. Hazards on the job site are considerably lessened, too. You can choose from four different colors—Corona Vermilion (shown), Cosmic Yellow, Sunset Orange and Comet Red.

PYRALUX Enamel uses new pigments to extend its fluorescent life to many months of continuous outdoor exposure. PYRALUX Clear applied over the enamel increases exterior color durability even further. Both are fast-drying and are applied by conventional spray methods. For big dividends in safety, order new Du Pont PYRALUX Enamel today!

The brilliant PYRALUX Colors are packed in gallons and quarts. Du Pont T-8805 Reducer is available in quarts, gallons and fives. PYRALUX Clear in quarts and gallons.

Du Pont PYRALUX is distributed nationally through automotive jobbers. Consult phone book for jobber nearest you.

Du Pont research leads refinish progress

DU PONT

REG U S PAT OFF

BETTER THINGS FOR BETTER LIVING
. . . THROUGH CHEMISTRY

Hyster Compactor Unit

new-design tamping wheels or with the firm's "Grid" wheels. The compactor operates as an integral part of the Cat DW20 tractor; rear tractor wheels are replaced with compacting wheels, and a gooseneck trailing roller contains two similar wheels. Combined coverage width is 10 ft. Existing tractor axles, brakes and bearings are used for the tractor compaction wheels.

Hyster Company, P. O. Box 328, Peoria, Ill.

For more details circle 103 on Enclosed Return Postal Card.

Tractor-Loader

Speedup of crawler tractor load moving cycles is available because of operating improvements provided in the company's new OC-96 tractor-loader announces The Oliver Corporation.

Powered by a 4-cylinder, valve-in-head diesel engine, the unit delivers 62 gross engine hp. Load handling speed increase is attributed to features such as power steering and Trans-O-Matic transmission. This transmission, reported to be the first of its kind offered in loaders of this class, eliminates clutching and allows instantaneous gear-shifting. A torque converter is standard equipment. Three types of turns, all powerized, boost performance of this loader, the maker states; with little effort the operator can spot turn

Oliver OC-96

on one track, make gradual turns within any radius, or execute a counter-rotation turns. Track length of almost 6 ft. gives full 1,714 sq. in. of ground contact with ground pressure at 5.6 lb. per sq. in.

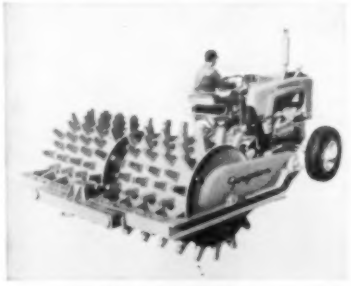
The Oliver Corporation, 400 W. Madison St., Chicago 6, Ill.

For more details circle 104 on Enclosed Return Postal Card.

Tamping Roller

The new Model SP-112-48 self-propelled tamping roller is announced by Shovel Supply Company.

Equipped with 70 hp diesel engine and 3-speed transmission, the roller is said to operate with equal efficiency in forward and reverse motion. Ballasted pressures up to 510 psi may be obtained. Elimination of the necessity for



Ferguson Roller

turning makes the roller especially suitable for widening work on highways and reduces hazard of passing vehicles, the manufacturer reports. Unit is said to operate efficiently in the compaction of narrow fills as well as on general compaction.

Shovel Supply Company, P.O. Box 1369, Dallas 21, Texas.

For more details circle 105 on Enclosed Return Postal Card.

Wheel and Crawler Tractors

Three new series wheel and crawler tractors with higher-capacity companion power equipment are featured in the 1960 J. I. Case Co. Utility line.

New Model 530 Utility Wheel tractor is powered by a 47 hp high torque

Case 310 Utility Tractor

Case 530 Backhoe-Loader

Case gasoline engine and has a 90 percent assist power-steer and synchronized shuttle transmission for ease of maneuvering and fast loading cycles. Shuttle transmission provides travel speed of 18 mph with 8 speeds in each direction. A Case-built backhoe for Model 530 cuts 14 ft. deep, digs 16 ft. 9 in. from pivot and operates through 180 deg. arc.

The new Model 430 Utility wheel tractor is constructed basically the same as the 530. It is powered by a 38.5 hp Case gasoline engine, has 4 speeds forward and one in reverse. Eight speed shuttle transmission, power steering and "All Traction Utility" tires as optional equipment. It may be equipped with a 1,000 lb. or 1,200 lb. loader, a 10 ft. backhoe and loader or the backhoe alone with front counterweight box.

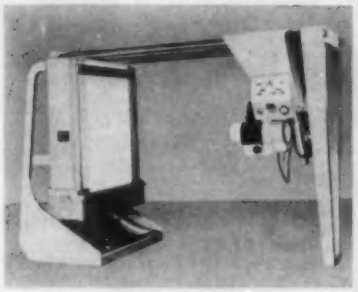
Model 310D Utility crawler tractor gives 5,815 lb. pull and push-power for use as a loader, bulldozer, angling dozer, loader-backhoe or drawbar unit. This tractor retains many features of previous models with improvements throughout, from engine to track assemblies, the manufacturer states.

J. I. Case Company, Racine, Wis.

For more details circle 111 on Enclosed Return Postal Card.

Projector-Printer

A new electrophotographic projector-printer capable of reproducing en-



K & E Kecofax

gineering drawings up to 34 by 48 in. is on the market from Keuffel & Esser Co.

Named the Kecofax Projector-Printer, the new equipment is said to be the first capable of producing electrostatic prints of such magnitude so virtually automatically. Film is loaded manually into a holder, the exposure time is set and a push of a button does the rest. Projection size is varied by moving the projector head on an overhead track to print any dimension ranging from 8½ by 11 in. to 34 by 48 in. A pre-set regulator permits the equipment to make up to 19 prints automatically from a single negative. The unit is 5 ft. wide, 14 ft. long and 7½ ft. high. It operates on an alternating current of 115 v. and 50 amps and weighs 2,100 lb.

Keuffel & Esser Co., Third and Adams Sts., Hoboken, N. J.

For more details circle 112 on Enclosed Return Postal Card.

Two-Ton Roller

Sta-Pac, a new two-ton roller, was recently developed by the Rolcor Division of Rosco Mfg. Co.

The unit has a variable weight from net of 2,100 lb. to a maximum of working weight of 4,000 lb. It has a 40 in. roller of 26 in. diam., and front and

Rosco Two-Ton Roller

rear sprinkler bars. The roller is powered by a 9 hp engine with a 12 v. starting system and generator. It will provide compaction up to 74 lb. per in., making it ideal for small as well as larger jobs.

Rolcor Division, Rosco Mfg. Co., 3118 Snelling Ave., Minneapolis 6, Minn.

For more details circle 113 on Enclosed Return Postal Card.

Diesel Tractors

The Reo Division of the White Motor Company has announced the addition of a new conventional line of diesel powered tractors. This line, designated the "E" series, includes ten models with gvw from 31,000 to 60,000 lb. with both single and tandem axles.

All models use Cummins diesel engines with hp ranging from 180 to 262. The new diesels offer two front axle positions. The standard axle position

Reo "E" Diesel Tractor

is 29⅞ in. from the front bumper, making it suitable for bridge formula states. Optional is the axle located 43⅞ in. from the bumper, permitting heavier front axle loading. For weight saving, the unit's flywheel housing, timing gear cover and oil pan are of aluminum; aluminum is optional in fuel tanks and tank brackets, transmission cases, cross members, battery boxes, hubs and wheels. Engines used are six cylinder valve-in-head units.

Reo Division, The White Motor Company, Lansing 20, Mich.

For more details circle 114 on Enclosed Return Postal Card.

Diesel Engine

An advanced V-8 diesel truck engine has been added to GMC Truck's complete "V" type engine family, it was announced recently by GMC Truck and Coach Division of General Motors Corporation.

The new 2-cycle 8V-71 diesels will be installed in three heavy-duty GMC tractor models in 1960. The three models will be 48-in. BBC aluminum tilt cab designs. The single axle model, DF7100 and tandem axle model DFW-7100 will have conventional leaf springs, while the DFR8100 will have air suspension. All are rated at 76,800 lb. G.C.W. This addition brings the truck line to eight basic powerplants.

Only 45 in. long, the unit's 2-cycle operation provides power on every piston downstroke, giving twice as many power impulses per minute as 4-cycle diesels. Two versions of the motor will be offered: a 260-hp powerplant for extra rugged terrain, and a 236-hp engine for flatter hauling. Gross torque of each unit is 733 lb. ft. at 1,200 rpm.

GMC Truck and Coach Division, General Motors Corporation, 660 S. Blvd. East, Pontiac 11, Mich.

For more details circle 115 on Enclosed Return Postal Card.

Continued on page 198

NEW

GILSON

Porta-Screen™

PORTABLE TESTING SCREEN

Motor or hand driven.
Samples up to 25 lbs.
1½-in. to 200-mesh

OPERATES free-standing on any surface; or bolted to a semi-permanent location; or on bare ground (with retractable spiked feet). DISMOUNTS in two portable sections.

USE *Porta-Screen* for:

- ★ field inspection and testing
- ★ ready-mix concrete plants
- ★ black-top plants
- ★ concrete products plants
- ★ small aggregates plants
- ★ lightweight aggregates
- ★ ores and minerals
- ★ mass separation for research
- ★ screening under direct wash water

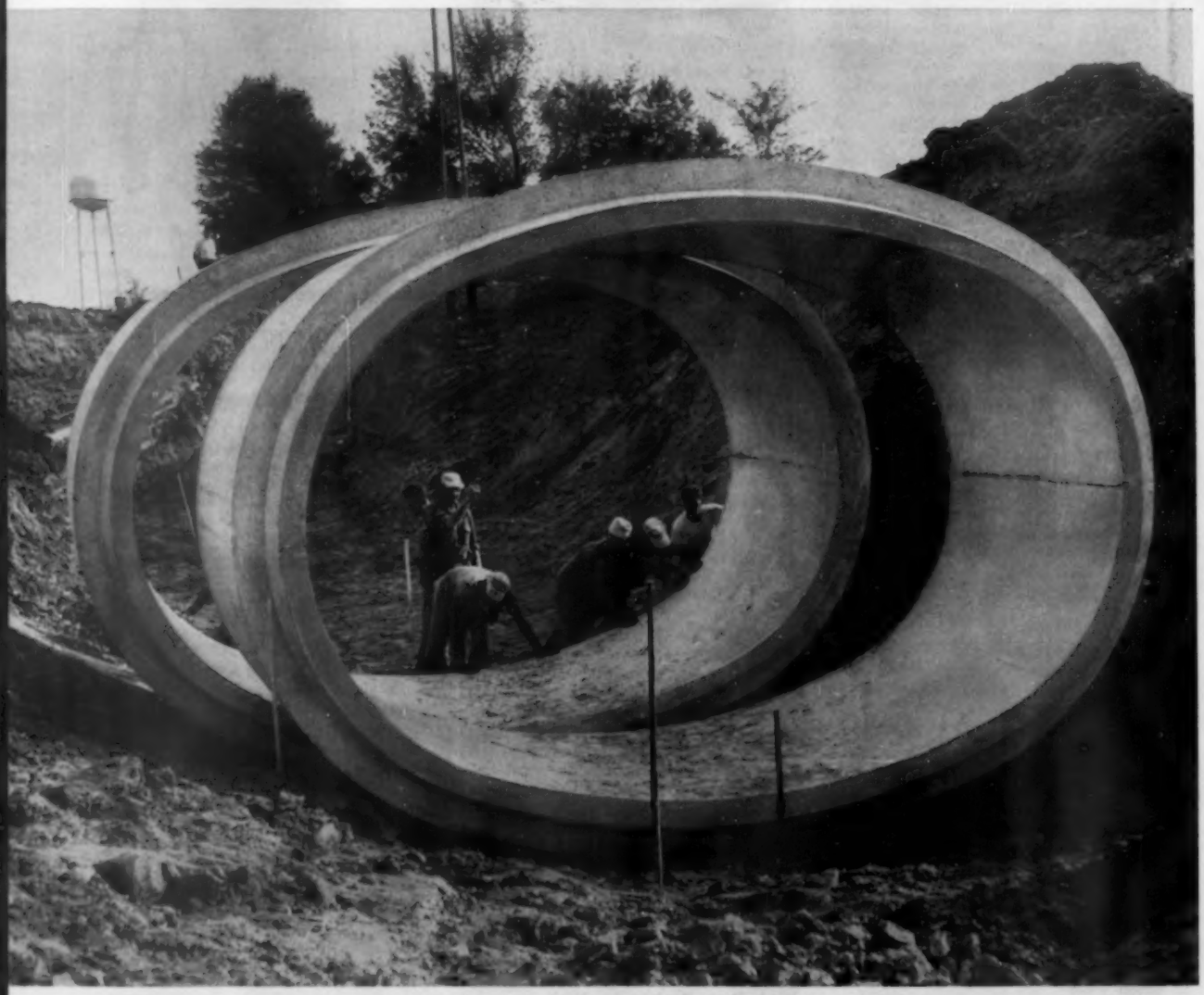
Porta-Screen *is made by the makers of the time-tested GILSON Testing Screen, the GILSON Sample Splitter, and other size-testing equipment and accessories.*

WRITE FOR LITERATURE

GILSON SCREEN CO.
MALINTA, OHIO

. . . for more details circle 316 on enclosed return postal card

USS American Welded Wire Fabric selected to



This is a 6-foot section of 144" elliptical concrete pipe. It has a greater flow capacity than its equivalent in round pipe and it can be installed in a minimum depth of cut with increased depth of cover. Elliptical pipe saves headroom—allows sufficient cover to reduce frost heave.

Lamar Pipe & Tile Division, American-Marietta Company, Grand Rapids—Pipe Manufacturer

L. W. Edison Company, Grand Rapids, Michigan—Contractor

USS American Welded Wire Fabric conforms perfectly to the elliptical shape of the 144" pipe. Because of the machine prefabricated accuracy of USS American Welded Wire Fabric, cages can be formed faster, and the spacing and concentricity of cages can be accurately controlled.

strengthen concrete pipe on Michigan Highway job

The Michigan State Highway Engineers faced a problem when it came to the selection of pipe for an important new highway in Berrien County. Hydraulic and grade line considerations dictated pipe with maximum water-carrying capacity with a low flow line, but with up to 33 feet of back fill. They selected over 1,000 linear feet of elliptical, reinforced concrete pipe. Diameters varied from the smallest to the largest—18" to 144".* Lamar Pipe & Tile Division, American-Marietta Company, manufactured the pipe.

In the case of the 480 feet of 144" required to withstand 33 feet of backfill, the specifications required 3 lines of reinforcement—an inner and outer cage each having 0.754 square inches per foot, and an elliptical cage having an area of 1.508 square inches per foot. Lamar Pipe & Tile elected to use American Welded Wire Fabric on this big job.

Concrete pipe manufacturers insist on quality reinforcing, meeting rigid specifications—that's why so many of them use USS American Welded Wire Fabric. This quality product—with its machine-made accuracy, assures the proper distribution of steel because the wire diameters are held to the close tolerance of ±0.003" and their spacing may not vary by more than ¼" center-to-center. This prefabricated product is more accurate than other forms of reinforcing. Its cold-drawn, high-tensile steel wires have a minimum yield point of 60,000 psi and a minimum ultimate strength of 75,000 psi. For more information, write to American Steel & Wire, 614 Superior Avenue, N.W., Cleveland 13, Ohio.

*Round equivalent

USS and American are registered trademarks

To increase the strength of the pipe, by resisting diagonal tension, 320 ¾" diameter stirrups are attached through the three cages of USS American Welded Wire Fabric.

American Steel & Wire Division of United States Steel

Columbia-Geneva Steel Division, San Francisco, Pacific Coast Distributors
Tennessee Coal & Iron Division, Fairfield, Ala., Southern Distributors
United States Steel Export Company, Distributors Abroad

. . . for more details circle 375 on enclosed return postal card

Hydraulically controlled Model 210 A-W crane inches 18-in. cast-iron water main into position in San Diego County, Calif.

How A-W crane speeds pipelaying

"The more we use our 3-year-old Austin-Western hydraulic crane, the more uses we find for it," states B. K. Stoneman Sons, Inglewood, Calif., mechanical contractor.

"For instance," they add, "it is excellent for pipelaying. Hydraulic controls permit placement of heavy pipe with speed and precision. The telescoping boom lets the operator work pipe forward for a perfect joint without even moving the machine. All-wheel drive and steer mean exceptional maneuverability and traction on any surface. The A-W is a real time and money-saver!"

Austin-Western now offers a complete line of *lift, carry and place equipment.* 5 models—capacity ranges up to 11 tons. Wide choice of optional equipment for added versatility. Available self-propelled, truck or stationary mounted. No other crane offers you all of the profitable advantages and quality construction features of an Austin-Western. Let us prove this to your satisfaction. Write for all the facts or ask your nearest A-W distributor.

Austin-Western

CONSTRUCTION EQUIPMENT DIVISION, AURORA, ILL.

BALDWIN · LIMA · HAMILTON

Power graders • Motor sweepers • Road rollers • Hydraulic cranes

. . . for more details circle 280 on enclosed return postal card

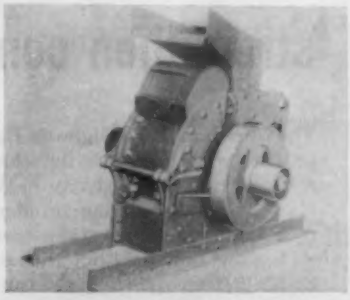
New Products

Continued from page 195

Hammer Crusher

An all purpose pulverizer for industrial and aggregate crushing installations has been announced by Iowa Manufacturing Company.

The pulverizer and crushing unit is designated the Cedarapids Model 20 Hammer Crusher. The result of operation is secondary pulverizing and crushing: from dust to 2 in. material, and as a pulverizer for burnt lime, gypsum, limestone, oyster shell, salt,



Iowa Model 20 Crusher

chalk, and most hard, dry, non-oily, non-fiberous materials. The unit is constructed with steel plate and lined with abrasion-resistant steel throughout the interior, plus reversible cross bar hammers and breaker plates to assure long life and low maintenance, the manufacturer states. Also, the unit is engineered with features such as simple wedge adjustment to assure smooth, steady flow of crushed material and even breaker plate wear.

Iowa Manufacturing Company, Cedar Rapids, Iowa.

For more details circle 116 on Enclosed Return Postal Card.

Material Spreader

Recently released by Highway Equipment Company is their new Model "TCS" material spreader for soil stabilization work.

The spreader features one-man operation, 8-ft. spreading width and accurate metering of materials from 5 to 70 lb. per sq. yd. Assured gate settings are said to be possible with this spreader: crank jack-type feedgate open, set three calibrated dials for cor-

Highway Eqpt. Spreader

rect depth of spread and lock dial. A single lever activates the transmission, agitator and conveyor. Drive shaft control lever disengages either drive wheel for cornering. This highly mobile unit has four wheels to give better balancing and throw no weight on truck hitch or rear of dump. Three-ply endless conveyor belt provides uniform lateral distribution of materials across the full width of the feedgate opening, the maker states.

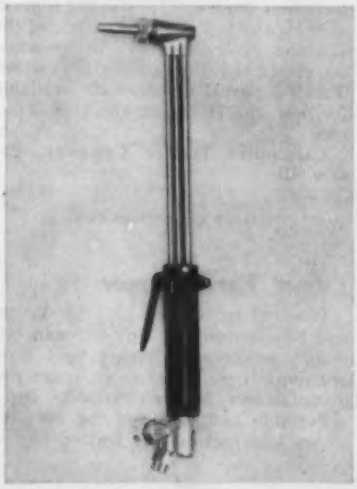
Highway Equipment Company, Dept. H44, 616 "D" Avenue, N.W., Cedar Rapids, Iowa.

For more details circle 117 on Enclosed Return Postal Card.

Rugged Duty Torch

A heavy duty cutting torch with flow capacity which enables it to cut through 24-in. steel has been announced by Smith Welding Equipment Corp. under the trade name of "Tuf-Tony".

Primarily designed for heavy cutting under all conditions, this torch features "Ease-on" oxygen control valve which permits gradual introduction of cutting oxygen. This is said to reduce slag spray and facilitate control in



Smith's "Tuf-Tony"

such processes as piercing, rivet washing and heavy cutting. Features include replaceable hose connections which are not integral with the forged butt; stainless steel needle valves which seat positively against brass; and "O" ring seals which prevent gas leakage, the maker states. The unit is available in lengths of 21 in. and 36 in. with heads of 75 and 90 deg.

Smith Welding Equipment Corp., 2633 Fourth St. S.E., Minneapolis, 14, Minn.

For more details circle 118 on Enclosed Return Postal Card.

Pushloading Equipment

Three new products developed to substantially increase pushloading production and reduce pit cycle time, have

Pennsylvania contractor chooses—

ALL-WHEEL DRIVE AND STEERING!

"We chose an Austin-Western Super 100 grader because we're a growing construction firm and need a single all-purpose grader that will handle an entire highway job from rough to finish grading."

All-wheel steering

"We've found it to be powerful, fast-working and dependable. All-wheel steering's slick. It lets you work the A-W in and out of tight spots where other make graders can't even go.

"Our operator is sold on it too. He likes the extra power he gets from its all-wheel drive. He says it's easy to maneuver and hydraulic controls make it easy to operate.

"We also bought an Austin-Western Roller-Compactor at the same time we bought the grader. Both have been dependable, trouble-free machines."—*S. P. Mehring, Mehring Construction, Hanover, Pa.*

Super, Pacer models

All-wheel drive and all-wheel steering are exclusive with Austin-Western grader line. These two features help make A-W the one grader that will perform every grading job with equal ease and precision; rough or finish. Ask an A-W owner or operator; learn what he has to say.

A-W graders are available in 6-wheel Super and 4-wheel Pacer models. Weight classes from 16,000 to 30,000 lb.; horsepower ratings from 106 to 143 hp. Get all the facts; ask for a demonstration. Just contact your nearest A-W distributor.

S. P. Mehring's A-W Roller Compactor lays fines on highway construction project. Vibratory attachment available for most makes of 3-wheel rollers.

Austin-Western

CONSTRUCTION EQUIPMENT DIVISION, AURORA, ILL.

BALDWIN · LIMA · HAMILTON

Power graders • Motor sweepers • Road rollers • Hydraulic cranes

. . . for more details circle 281 on enclosed return postal card

BRAND NEW Barricade Flash!

the Big Beam TRANSISTA FLASH

- Transistor type, heavy duty for long, dependable life.
- No moving parts to get out of order.
- Two-directional head or 360° dome type Fresnel.
- Electronic flashing mechanism weatherproofed. Telescoping top and rubber gasket make battery case completely weatherproof.
- Acid-proof plastic liners prevent interior case corrosion.

TRANSISTA FLASH produces approximately 2000 hours of continuous flashing from two standard 6-volt batteries, available anywhere. Provided with a concealed, tamper-proof switch operated from outside of case. Equipped with bracket for attaching to barricade. Lens or Fresnel supplied in either amber or red plastic—specify color. Flash frequency is approximately 72 times per minute. Lamp is finished in yellow baked enamel.

Model 410T

No. 433 Barricade—All metal, strong, stable on any surface. Has angle iron construction, closed ends.

Model 418T—with dome type Fresnel.

Model 417T—7 inch head. Otherwise, same as Model 410T.

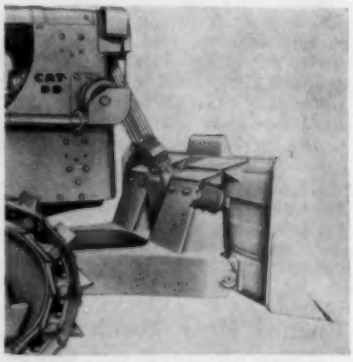
Big Beam—makers of explosion-proof lamps, emergency lights, hand lamps and flares. 6393

U-C-LITE MFG. CO. 1683 West Hubbard Street Chicago 22, Illinois

Export Department: 201 N. Wells St., Chicago 6, Ill. Cable Address: ENOTS
In Canada: Bernard Marks & Co. Ltd., 70 Claremont St., Toronto 3, Ontario

. . . for more details circle 372 on enclosed return postal card

New Products



Cat. No. 9C Cushion Dozer

been announced by Caterpillar Tractor Company.

The inside mounted No. 9C Cushion-Dozer and the case-mounted Cushion Push Block, permit approach and contact of push tractors at relative speeds up to 5 mph. The rear-mounted tandem pusher C-frame is designed for use on tractors equipped with standard bulldozer blades. The No. 9C is available for the D9E Tractor only, and the Cushion Push Block can be mounted on either the D9E or D9D Tractors. Tandem pusher C-frames are available for both the D8H and the D9E Tractors.

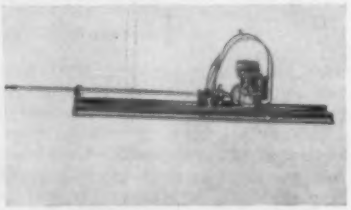
Caterpillar Tractor Company, Peoria, Ill.

For more details circle 119 on Enclosed Return Postal Card.

Power Earth Auger

Powered by a 3 or 5.75 hp Briggs and Stratton engine, this one-man operated power earth auger will drill horizontally 200 ft. or more, states the manufacturer, Modern Products, Inc.

Portable and accurate, the unit removes loosened dirt by hydrodynamic



"Modern" Earth Auger

action—water-flush removal of dirt. A 2-in. hole can be drilled laterally at the rate of 5 fpm. Return drill bits are available in 4, 6, 8, 10 and 14-in. sizes in diam. The auger is mounted on ball bearing wheels assuring easy movement along 7 ft. tracks; it uses 5 ft. sections of ¾ in. pipe in drill stems.

Modern Products, Inc., Exeter, Nebraska

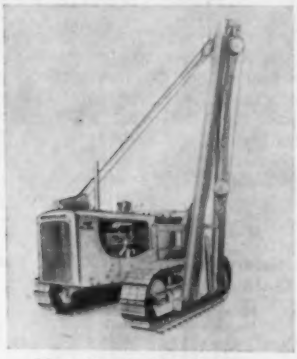
For more details circle 120 on Enclosed Return Postal Card.

High Capacity Pipelayer

A new pipelayer capable of 12,270 lb. of greater lifting capacity than its predecessor has been announced by Caterpillar Tractor Company. It is the new No. 561 Series B and will replace the MD6 pipelayer.

Maximum lifting capacity of the 561 is 38,800 lb. at 4 ft. overhang with 5,000 lb. adjustable counterweights. Two other stationary counterweight groups are available; one weighs 2,500 lb. and the other 3,500 lb.

In-seat or manual starting is available, and controls on the new unit permit short, direct arm movements by the operator. A special safety feature is the spring loaded boom brake lever which returns automatically to "brake-on" position when released.



New Cat Built Pipelayer

The unit has 74 in. gage and uses 18 in. grouser shoes. There is a total of 3,130 sq. in. of ground contact with an approximate operating weight of 25,300 lb. Minimum ground clearance is 10.5 in. Standard boom length is 15 ft. with optional booms of 12.5 ft. and 18 ft. available.

Caterpillar Tractor Company, Peoria, Ill.

For more details circle 121 on Enclosed Return Postal Card.

Vibrator-Generator

A new vibrator-generator combination consisting of an eccentric rotor concrete vibrator with one moving part and a brushless, bearing-less generator is now produced by Master Vibrator Company.

The simply-designed motor-in-head vibrator features an "inside-out" motor with the rotor on the outside and the stator inside. Internal stator remains stationary, while the unbalanced

Master's Vibrator-Generator

rotor revolves around it causing the head to vibrate. Rotor is the only moving part. Head diameter of the vibrator is 2⅝ in. with standard casings in 7, 14 and 21 ft. lengths.

The one-man operated vibrator runs on 115 v, 180 cyl. current provided by an 80 lb., 1,200-w. permanent magnet generator with no wearing parts. Only moving part in the generator is a permanently magnetized armature that whirls in the air held away from the other parts by a magnetic field.

Master Vibrator Company, 1752 Stanley Ave., Dayton 1, Ohio.

For more details circle 122 on Enclosed Return Postal Card.

Scraper Ripper

The Hensley Equipment Company announces the development of a new portable twin shank carry-all or scraper ripper available in three sizes and operable on all scrappers utilizing independently operated apron or door.

The rippers, usually three units or six shanks, can be installed in less than five minutes, the maker states. This is made possible through elimination of all fastening or welding devices. The units are also said to be lightweight enough to transport in auto or pick-up truck. The scraper ripper will operate in rock, shale and hard pan and is reported to be especially effective in black top removal. 15 in. scraper bars break rip rap into chunks no larger than the 15 in. clearing area.

Hensley Twin Shank Carry All

Hensley Equipment Company, Inc., 800 Peralta Ave., San Leandro, Calif.

For more details circle 123 on Enclosed Return Postal Card.

Truck-Mounted Hoe

A truck-mounted hoe from Hydraulic Machinery Company that offers ⅜ yd. struck capacity is the new Hy-Hoe 250.

Heaped loads of ½ yd. or more are said to be possible under job conditions with heavy or light material. Making this added capacity possible are a 1,500 psi hydraulic system with 5¼ in. i.d. cylinders throughout, 180 deg. wristing action at bucket and

HY-HOE 250

counter-weighted truck front end for added stability. The unit can be mounted on any new or used 2 ton truck. All weather backhoe cab is available.

Hoe has a 200 deg. boom swing, digs 14 ft. deep, has a 20 ft. reach and 11-ft. dump clearance. Three independently hydraulic circuits of 25 gpm each are used. Fast cycling hydraulic system lets the operator swing load 90 deg. in approximately 2 sec.

Hydraulic Machinery Company, Waukesha, Wis.

For more details circle 124 on Enclosed Return Postal Card.

Heavy Duty Ripper

Designed to match the performance features of the TD25, a new heavier-

609 North Main • Fort Worth • Cable Hobbsco

. . . for more details circle 384 on enclosed return postal card

New Products

duty version of the ATECO rock ripper is offered by American Tractor Equipment Corporation.

A feature of the new Model HR48-TD25 is the offset tool beam, said to provide ample clearance for mounting the ripper on tractors equipped with rear-mounted power control winches. Traditional features are retained: ripper perfectly balances dozer weight for increased traction, swivel-mounted shanks permit easy steering, various shanks and points are interchangeable to meet all job conditions. Maximum ripping depth is 48 in. with standard shanks. Greater tool beam lift has been provided to give clearance for "pipeliner" and cable-laying shanks.

American Tractor Equipment Corporation, 9131 San Leandro Blvd., Oakland, Calif.

For more details circle 125 on Enclosed Return Postal Card.

Transverse Finisher-Float

This Jaeger Model "JF" 20-26 ft. transverse finisher float is designed to give a final machine finish to concrete pavements without added labor. Towed by and operated from any finishing machine, it requires no separate operator.

The unit is equipped with both oscillating screed and a transverse float. Screed and float pan are suspended between bogie axles, providing

Jaeger Finisher Float

a 4-to-1 ratio of correction. Its total wheelbase of 17 ft. 5 in. always spans at least two sections of forms, the maker states. Standard screed has a 6 in. bottom; float pan has a 30 in. bottom. Both are quick crown change type. Screed has 4 in. oscillation with 3 speeds of 49, 76 and 130 strokes per minute. Screed drive and the lifting and lowering of screed and float pan are all hydraulically operated. In operation, unit is towed behind finishing machine and controlled by finisher operator.

The Jaeger Machine Company, Columbus 16, Ohio.

For more details circle 126 on Enclosed Return Postal Card.

Corrosion Abater Coils

Designed to scientifically stop battery terminal and post corrosion and

Aabco Abator Coils

plate sulphation, these Aabco Abater Coils are said to be easily installed without the use of special tools. The coils are applicable to 6 or 12 volt batteries.

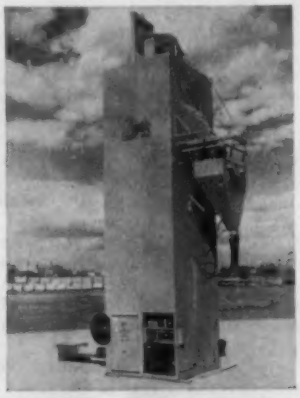
Aabco, 5015 Cowper, Dallas 5, Texas.

For more details circle 127 on Enclosed Return Postal Card.

Portable Cement Silo

The Ross Porta-Plant Company has announced the addition of a practical refinement to their portable cement silos.

In the future, the many slide areas of all of their portable cement silos



Ross Improved Silo

will be coated with a glass like material to insure the uniform and proper flow of cement at all times, the maker states. This process is said to obviate the possibility of cement adhering to the steel surfaces.

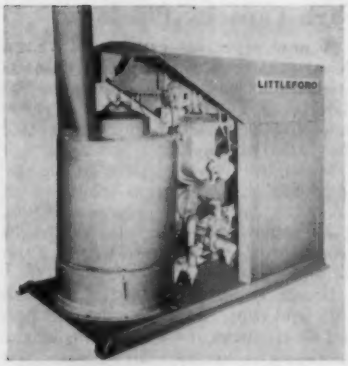
Ross Porta-Plant, Box 446, Brownwood, Texas.

For more details circle 128 on Enclosed Return Postal Card.

Hot Oil Heater

The Littleford Hot Oil Heater from Littleford Bros., Inc., is capable of producing 450 deg. of hot heating oil without need of a protective building.

The unit utilizes the oil expansion



Littleford Oil Heater

tank under which is nested all operational controls and drives, protected by removable doors.

Vertical down-fire coil type furnace permits forced air combustion with a cross flow of hot gases over the entire heating area. Pressure controls automatically shut down the heater's burner if a leak should develop in the piping connections, thus allowing the hot oil to escape. The relief valve of the pump protects against excessive oil pressure. A 24 hour timer permits completely automatic operation.

Littleford Bros., Inc., 457 E. Pearl St., Cincinnati 2, Ohio.

For more details circle 129 on Enclosed Return Postal Card.

Lateral Shifting Trencher

With instant lateral positioning and tilting of its digging wheel, the new Cleveland JS-30 digs trench behind either crawler or at any point within its 6 ft. width.

Lateral shifting of the digging wheel enables the JS-30 to dig the edge of a 24-in. wide trench 5 in. outside either track permitting trench to be dug flush with parallel pavement, curbs and sidewalks. Hydraulic power tilting of the digging wheel 7 degrees to either side of vertical, enables the unit to dig vertical trench on side slopes, adjacent to curbing, etc., without cribbing, the manufacturer states. The JS-30's crumbing shoe can be raised or lowered from the operator's seat. Shoe

Cleveland JS-30

Continued on page 205

Vibrating shoes consolidate fast, deep for profitable single-course construction!

100% consolidation of subbase materials is often possible in only one pass with a Lima Roadpacker. High-speed vibrating action fills voids, keying materials to depths of 12 in. and more.

Fewer courses, passes

Single-course construction with a Roadpacker is more profitable, because you need lay fewer courses and make fewer passes than with less efficient consolidation equipment.

Working widths can be varied up to 13 ft., 1 in. End shoes fold up for highway travel at speeds to 30 mph. Roadpacker works at speeds from 20 to 95 fpm; consolidates up to 600 tons per hour. Works forward or in reverse, never shoves material. Self-propelled; gasoline or diesel engine. Easy to operate; good visibility. Optional widener attachment is available to replace trench rollers.

Lima Roadpackers are easy to maintain. Hydraulically operated vibratory shoe mechanisms are completely sealed from abrasive dust; maintenance free.

Super model available

Lima also offers a new 12-shoe *Super* Roadpacker for extra-high-production consolidation on large construction jobs such as superhighways, air bases and earth-fill dams. It has more than double the consolidating capacity of any multiple shoe vibratory machine!

Learn more about the profit-making features of Lima Roadpackers. See your nearby Lima distributor today or write to Construction Equipment Division, Baldwin-Lima-Hamilton Corporation, Lima, Ohio.

MODEL D ROADPACKER—International favorite for high-speed, high-production consolidation on highway and airport construction.

NEW 5-YD. LIMA LOADER digs, scoops, swings and loads from stationary position; no waste motion. Fast, economical way to handle bulk materials.

DISTRIBUTORS IN PRINCIPAL CITIES OF THE WORLD

LIMA Construction Equipment Division, Lima, Ohio

BALDWIN · LIMA · HAMILTON

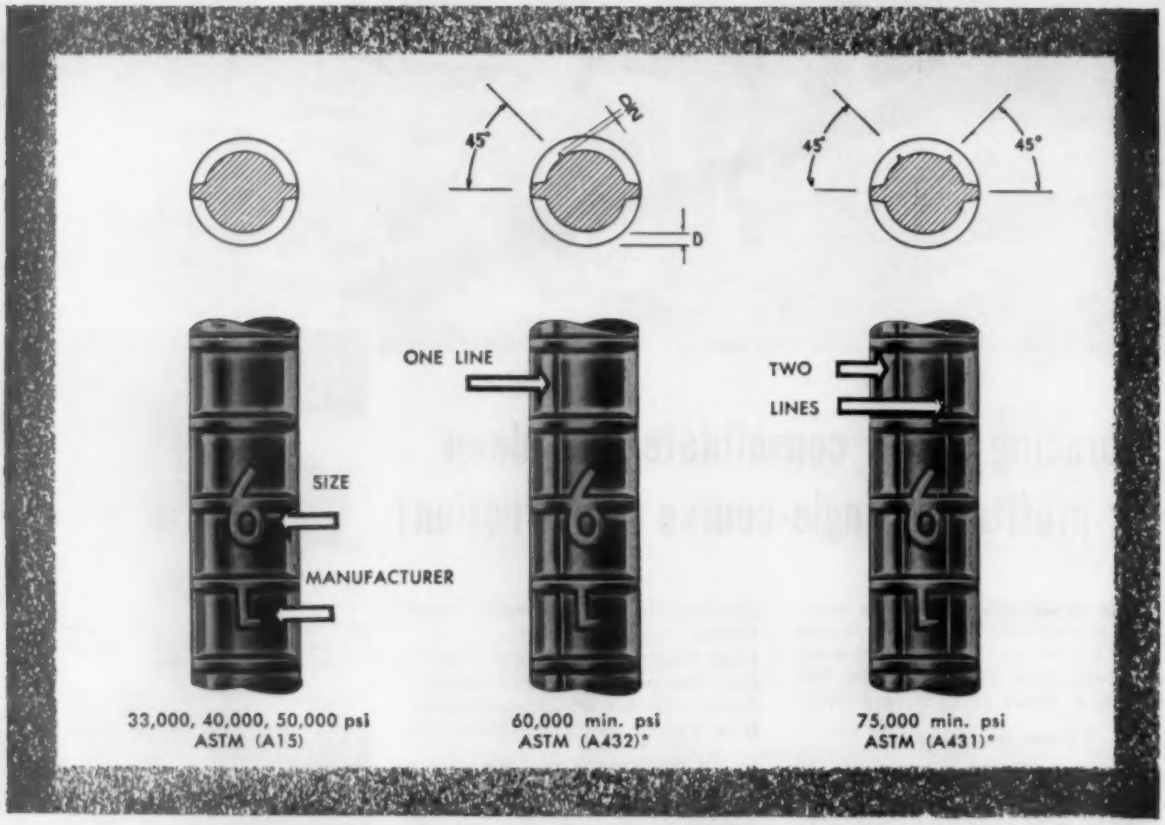
6024

Shovels • Cranes • Draglines • Pullshovels • Roadpackers • Crushing, Screening and Washing Equipment

BALDWIN BLH LIMA-HAMILTON

NOW...

Every LACLEDE Multi-rib Reinforcing Bar is Marked to Show SIZE and STRENGTH...



Standard high strength steels* permitting greater economy and efficiency in reinforced concrete design under the provisions of the new A.C.I. codes must be **identified.** Recognizing this need, each Laclede Multi-rib reinforcing bar can now be completely identified as to size, strength and origin through a new rolled-in marking system. This assures the designer, contractor, and code writer that the proper grade of reinforcement is used on the job.

Demand these new time-saving Laclede bars for your next construction job.

LACLEDE

LACLEDE STEEL COMPANY

SAINT LOUIS, MISSOURI ◆ Producers of Steel for Industry and Construction

. . . for more details circle 341 on enclosed return postal card

New Products

Continued from page 202

pivots up above the digging wheel so that the wheel can be set in for digging at driveways and other obstructions without extra clearance room for the shoe.

Cleveland Trencher Company, 20100 St. Clair Ave., Cleveland 17, Ohio.

For more details circle 130 on Enclosed Return Postal Card.

Hydraulic Pumps

Double pumps have been added to their line of vane type hydraulic pumps announces Vickers Incorporated, A Division of Sperry Rand Corporation.

The new double unit extends the range of application by providing one power source for two separate hydraulic circuits or greater volume through combined delivery of both sections. A

Vickers Double Pumps

wide variety of ring sizes available in each section of the double pump offers a selection of capacities ranging from 8 gpm in the small section to 77 gpm in the large section. The pumps utilize the replaceable cartridge feature plus optional flow control and relief valves that can be made integral with the small volume side of most High Performance double pump models.

Vickers Incorporated, Division of Sperry Rand Corporation, Detroit 32, Mich.

For more details circle 131 on Enclosed Return Postal Card.

Tamper Trailer

The Jay Division of J. Leukart Machine Co., Inc. has unveiled a new, specially-designed trailer to facilitate easy transport of Jay tampers.

Jay Trailer

The trailer is balanced to permit easy loading or unloading by one man of tamper models J-13, J-18 or J-36; the unit is balanced to carry any one of the three. The trailer is a lightweight 110 lb. of tubular welded construction. Metal disc wheels have Timken tapered roller bearings and 4.00-8 pneumatic tires with tubes. It is 92 in. long and 50 in. wide as measured between centers of the tire treads. It has the standard socket for 1⅞ in. ball head trailer hitch.

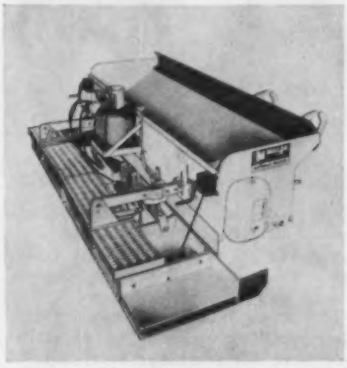
Jay Division, J. Leukart Machine Co., Inc., Columbus, Ohio.

For more details circle 132 on Enclosed Return Postal Card.

Towed Pavers, Spreaders

A new thickness gage which can be installed on all of Miller Spreader Corporation's towed pavers, has become standard equipment on all of the firm's new spreaders.

By setting the screed adjustment screw to the level pointed out by the thickness gage indicator needle on the built-in thickness setting dial, the operator knows immediately the thickness of the asphalt from the start of the job. Adjustments can be made efficiently and easily to meet paving conditions during the job. Also included on the units is the speed crank hoist for rapid raising or lowering to control desired thickness of material courses.



Miller Paver

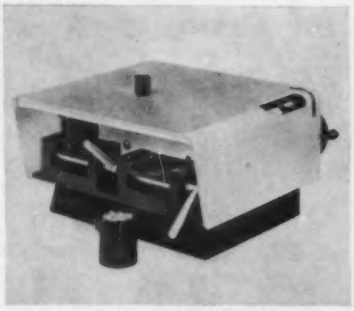
Miller Spreader Corporation, 4020 Simon Rd., Youngstown, Ohio

For more details circle 133 on Enclosed Return Postal Card.

Air Operated Pycnometer

A recent invention has resulted in a new product from the Houston Instrument Corporation which allows the determination of true volume as well as the density, specific gravity or porosity of solid materials whether they be porous, granular, powdery or irregular in form.

Based upon the principle that two closed systems of air at the same temperature and pressure will have identical specific volumes, this new invention allows direct digital indication of the true or absolute volume of any solid substance with only a one minute procedure. The procedure may be handled by an inexperienced operator after brief instruction, the maker states. The initial instrument will have a choice of 50 cc or 100 cc sample containers. Readout will be in cubic centimeters or cubic inches as desired by the user.



Houston Pycnometer

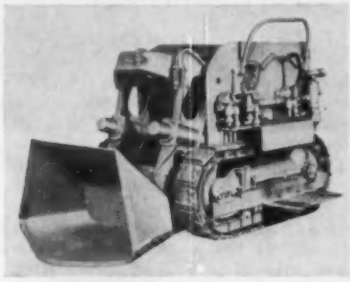
Houston Instrument Corporation, P.O. Box 22234, Houston 27, Texas

For more details circle 134 on Enclosed Return Postal Card.

Rocker Arm Rail

A new rocker arm rail for use on Eimco Corporation's 630 Excavator Loader and other Rocker Shovels was announced recently.

The new rail allows lowering of the rolling path of the overhead rocker arm on this equipment, without reducing the required strength of the rail elements which support the rocker arms during the operation, the manufacturer reports. The Eimco 640 is a crawler-type machine for underground rock or mineral loading and can be powered by air or AC electric motors.



Eimco 630 with Rocker Arm Rail

The Eimco Corporation, P.O. Box 300, Salt Lake City 4, Utah

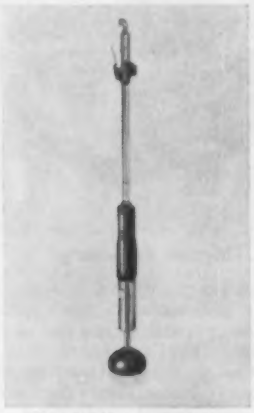
For more details circle 135 on Enclosed Return Postal Card.

Hand-Held Tampers

Three new hand-held sand wiper backfill tampers have been announced by Ingersoll-Rand Co. to produce compaction density on higher lifts than have been previously possible with hand-held tools.

The tampers have a specially de-

New Products



Sand Wiper Backfill

signed front seal of neoprene-felt that wipes the surface of the chrome-plated piston rod completely clean. This prevents entrance of any fill or abrasive material into the bore of the guide or the barrel, the manufacturer states. The size 241 sand wiper backfill tamper, including butt, is 52¾ in. long and weighs 26⅞ lb. Corresponding specifications for size 341 and 441 are 52¾ in. long, 34⅞ lb. and 50⅞ in. long, 47⅛ lb., respectively.

Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.

For more details circle 136 on Enclosed Return Postal Card.

Engine Line Addition

Allis-Chalmers Manufacturing Company has expanded its line of gasoline and natural gas engines with the addition of the G-138, a new, 4-cycle, 4 cyl., 138 cu. in. displacement unit that develops 39 hp at 1,800 rpm.

The new engine is a companion to the A-C G-149 and G-226 engines and has a power unit 46 in. long, 18$\frac{15}{16}$ in. wide and 30½ in. high to top of the radiator. It has a heavy-duty clutch power take-off and a large diameter flywheel for ease of starting and smooth pickup of loads. Economical operation

A-C 39 hp G-138 Engine

results from a high compression ratio of 7.75 to 1. with regular fuel. The unit has full pressure lubrication together with efficient air and oil filtering systems, the manufacturer states.

Allis-Chalmers Manufacturing Company, Tractor Group, Milwaukee, Wis.

For more details circle 137 on Enclosed Return Postal Card.

Tractor-Shovels

The Series B models of the H-70 and H-90 "Payloader" tractor-shovels from The Frank G. Hough Company, Subsidiary of International Harvester Company, are said to offer numerous improvements which increase production and better performance of these four-wheel units.

Operating capacity of the H-90 Series B unit remains at 9,000 lb. but peak lift has been increased to 18,000 lb. The unit now has a longer wheel base and wider tread. Additional pow-

Model H-90 "Payloader"

er is provided by a new Cummins Turbo-Charged diesel engine which develops 162 hp at 2,100 rpm. A GMC diesel which develops 153 hp at 2,200 rpm is offered as an option.

The Series B, H-70 "Payloader" retains operating capacity of 7,000 lb. with peak lift increased to 18,000 lb. Improvements in the boom arm design and bucket control linkage provide additional digging power, especially helpful for below grade work, the manufacturer states. A choice of two engines is also available.

The Frank G. Hough Co., 984 Seventh Ave., Libertyville, Ill.

For more details circle 138 on Enclosed Return Postal Card.

AC/DC Welder-Power Plant

Featuring the Gold Star rectifier and powered by a Kohler 25 hp, 2 cyl., air-cooled gasoline engine, the new Miller Electric Mfg. Co., Inc. welder-power unit was recently introduced.

The unit is reported to function efficiently for the performance of AC welding, DC welding, metallic inert gas welding, generation of 7 kw of 115 v DC power while welding, warming viscous fluids for pumping, thawing frozen pipes, battery charging and boosting. The model will deliver 300 amps at 30 v AC or 225 amps at 30 v DC welding power at 100 percent duty cycle. Open circuits of 75 v AC and

Miller Welder-Power Unit

65 v DC assure results with AC, DC or AC-DC electrodes, the manufacturer states. Optional equipment includes road trailers and remote controls.

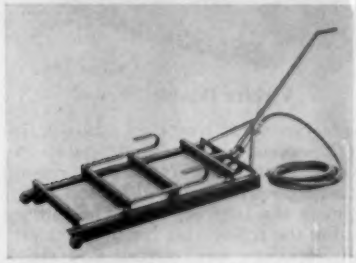
Miller Electric Mfg. Co., Inc., Appleton, Wis.

For more details circle 139 on Enclosed Return Postal Card.

Asphalt Surface Heater

A new portable, lightweight, asphalt surface heater that can be operated by one man, has been announced by the Essick Manufacturing Company.

The unit produces highly concentrated heat in a small area to quickly heat asphalt to a working consistancy. Available in two models, the heater has



Essick Surface Heater

been developed for the repair and removal of asphalt bumps and push-ups, removal of traffic lane lines and for drying pot holes prior to patching. The heater is fired by LP gas and is equipped with hooks for hanging on the tailgate of a truck.

Essick Manufacturing Company, 1950 S. Santa Fe Ave., Los Angeles 21, Calif.

For more details circle 140 on Enclosed Return Postal Card.

Concrete Buckets

Lull Engineering Company recently announced a new swivel-type ⅜ cu. yd. concrete bucket.

This bucket has a swivel of 180 deg., giving a 5-position lock. It is mounted on ball bearings and easily swiveled by hand, the maker states. Bucket is so designed to fit any of the Lull 7B Hi-Lifts. Dumping is done hydraulically and controlled from the operator's seat. Swivel bucket permits operator

Continued on page 109

Columbia Calcium Chloride eliminates the nuisance of dust (above) and the threat to driving safety on unpaved roads.

Columbia Calcium Chloride keeps unpaved roads dust free . . . reduces aggregate loss, too

This summer, use Columbia Calcium Chloride to keep dust down on the road where it belongs and not in the public's eye. And at the same time, cut maintenance and material costs.

Columbia Calcium Chloride keeps roads firm, smooth and dust free because it absorbs moisture from the air and retards evaporation from the road surface to hold down dust. Firmer surfaces made possible with Columbia Calcium Chloride give better bearing and less aggregate loss.

That's why public officials who know the importance of dust-free roads from a budget and public viewpoint, include Columbia Calcium Chloride in their dust control program. Their roads stay safe to drive on, pleasant to live by.

Start now to make all your unpaved roads trouble-free, economical Columbia Calcium Chloride roads. For more information, contact our nearest District Office or write our Pittsburgh Address.

You'll like doing business with Columbia-Southern

columbia | southern chemicals

COLUMBIA-SOUTHERN CHEMICAL CORPORATION • A Subsidiary of Pittsburgh Plate Glass Co. • One Gateway Center, Pittsburgh 22, Pa.
DISTRICT OFFICES: Cincinnati • Charlotte • Chicago • Cleveland • Boston New York • St. Louis • Minneapolis • New Orleans • Dallas • Houston Pittsburgh • Philadelphia • San Francisco
IN CANADA: Standard Chemical Limited

. . . for more details circle 300 on enclosed return postal card

portrait of an airport...

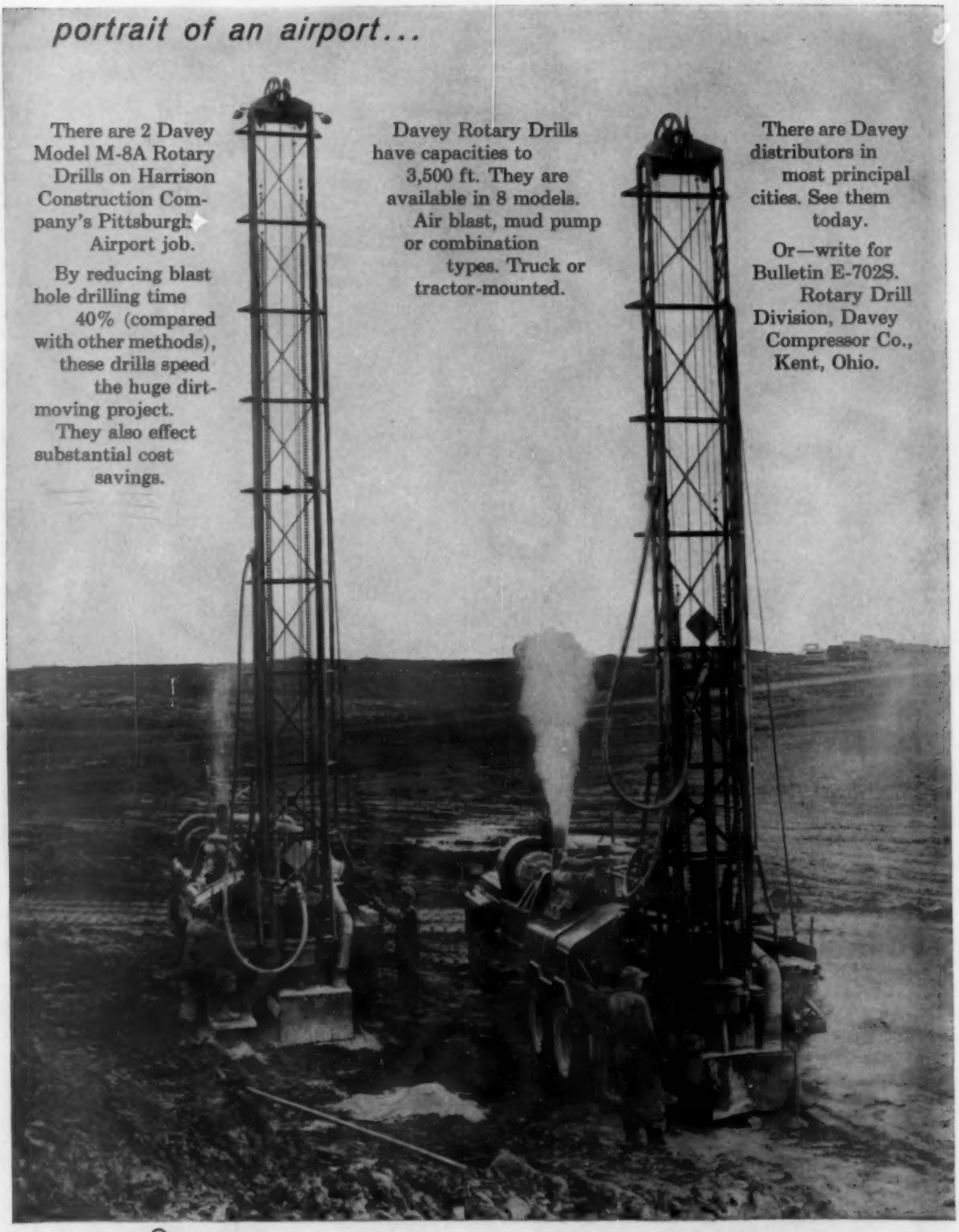
There are 2 Davey Model M-8A Rotary Drills on Harrison Construction Company's Pittsburgh Airport job.

By reducing blast hole drilling time 40% (compared with other methods), these drills speed the huge dirt-moving project. They also effect substantial cost savings.

Davey Rotary Drills have capacities to 3,500 ft. They are available in 8 models. Air blast, mud pump or combination types. Truck or tractor-mounted.

There are Davey distributors in most principal cities. See them today.

Or—write for Bulletin E-702S. Rotary Drill Division, Davey Compressor Co., Kent, Ohio.



DAVEY
pioneers of "air-cooled air"

DAVEY COMPRESSOR CO.

Kent, Ohio

Rotary Drills — Portable, "Auto-Air", Tank-Mounted and Stationary Compressors
Air Tools — Mobile Machine Shops

A-2869A

. . . for more details circle 301 on enclosed return postal card

New Products

Continued from page 206

Lull Swivel Bucket

to travel parallel to forms and discharge load to either side. Bucket shown is dumping at a 45 deg. angle, however, it can be dumped at angles up to 90 deg., right or left.

Lull Engineering Company, 3045 Highway 13, St. Paul 11, Minn.

For more details circle 141 on Enclosed Return Postal Card.

Variable Speed Trencher

The Brown Manufacturing Company, Inc., is marketing a new and larger model of its Bus Brown Trencher. The new unit, Model 468R, weighs 350 lb. and offers more trenching width than its predecessor, Model 346.

Trenching speeds up to 12 fpm are

New Bus Brown Trencher

offered as well as trenching of ditches up to 12 ft. wide. Powered by a 12 hp Wisconsin engine, the unit has four-wheel drive and a hydraulically controlled digging boom that can be raised to an upright position. The trencher operates on all four wheels while digging and on rear wheels while in transport position.

The Brown Manufacturing Company, Woodbine, Iowa

For more details circle 142 on Enclosed Return Postal Card.

Portable Compressor

Worthington Corporation has introduced a new 900 cfm Blue Brute Portable Rotary Compressor, built with the firm's patented "Over-Under" design. This design puts the second-stage compressor cylinder directly under the first stage, providing accessibility for maintenance and self-draining of compressor oil.

Effective oil separation is attained

Blue Brute 900

through two stages: a lifetime filter unit and an inexpensive final filter. Automatic control stops the engine in case of high discharge air temperature, overheating of cooling water, or low engine oil pressure. Interlock control feature of the clutch prevents engaging the clutch while the engine is running, and the cutout switch prevents starting the compressor with air pressure in the air receiver.

Worthington Corporation, Harrison, N. J.

For more details circle 143 on Enclosed Return Postal Card.

Positioning Cylinder

Holan Corporation has made available a transverse positioning cylinder for use on their No. 6800 Derrick with all Holan hydraulic earth borers.

The new cylinder enables the operator to move the digger sideways. It becomes the working companion of the "fore and aft" or longitudinal positioning cylinder. Sideway travel of the digger makes it possible to bore at a curbside with truck parked at a shallow angle. From centerline of derrick, transverse positioning cylinder will move the digger 11 in. to the left side and 29 in. to right of curbside. The cylinders are said to reduce truck maneuvering, maintain straight line feed, permit boring of anchor holes without repositioning truck and speed hole starting in rough, uneven terrain. Positioning cylinders can be used on the 6800 Derrick with Series 5400, 4450 and 4401-H earth borers.

Holan Positioning Cylinders

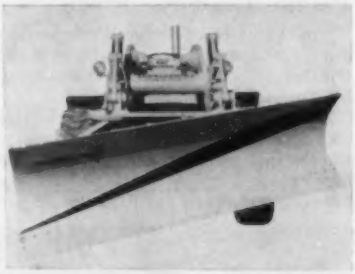
Holan Corporation, 4100 W. 150th St., Cleveland 35, Ohio

For more details circle 144 on Enclosed Return Postal Card.

Hydraulic Angledozer

Hydraulic tilt control is featured in the new Balderson BA944 Angledozer when attached to Caterpillar's No. 944 Traxcavator. Designed to increase the usefulness of Cat's latest wheel-type loader, the attachment mounts on the lift arms in place of the bucket.

When used in straight position, the extension brace folds in behind the blade. Hydraulic pitch control is ob-



Balderson Angledozer

tained when used as a straight dozer, by actuating the bucket dump cylinders. The BA944 blade measures 35 in. high by 10 ft. 2 in. long. When angled to the right or left at 25 deg., it cuts a 9 ft. 2 in. path. In addition to the angling blade attachment, the firm will also supply U-blades and snow plows for the 944 Traxcavator.

Balderson, Inc., Wamego, Kansas

For more details circle 145 on Enclosed Return Postal Card.

Tractor-Shovel

A new tractor-shovel in their "Payloader" line has been announced by The Frank G. Hough Co., A Subsidiary of International-Harvester Company.

Hough H-30 Payloader

New Products

The new Model H-30 has an operating capacity of 3,000 lb. and is equipped with a 1 cu. yd. (S.A.E. rated) bucket.

The four-wheel drive features full power-shift and "Paylomatic" transmission with matched torque-converter. With 3 speed ranges in all directions, shifts can be made on-the-go with no necessity to stop for "range" shifts. Clearance under the cutting edge with bucket in dumped position is 8 ft. 4 in.; dumping reach ahead of the front tires is 29 in. The Hydraulic system of the unit includes an oil reservoir which is closed and pressure-controlled with built-in cartridge-type oil filter and fine mesh strainer to exclude dust and dirt. A separate fan-cooled oil-to-air radiator cools both transmission and torque converter oil.

The Frank G. Hough Co., 768 Seventh Ave., Libertyville, Ill.

For more details circle 146 on Enclosed Return Postal Card.

Pneumatic Tire Roller

For 13 tons of rugged compaction duty, the new 11 wheel American Road Runner, Model 11WG, is constructed by American Steel Works.

The two center rear wheels are spring mounted to allow the drive wheels full traction and to eliminate high centering. A 57.5 psi rolling pressure and up to 295 lb. pressure per

American Road Runner

lineal inch of tire width is possible with this model, the maker reports. The unit's engine, reversomatic control, torque converter, transmission, differential and final wheel drive are specifically designed and built to work as a unit. The roller's accessories include one 80 gal. or two 160 gal. water tank systems, working and running lights and 10 ply, 90 psi tires with heavy duty flat base demountable rims.

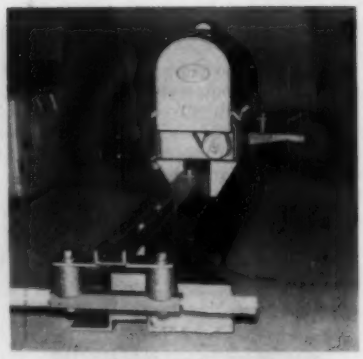
American Steel Works, 2700 Holly St., Kansas City 8, Mo.

For more details circle 147 on Enclosed Return Postal Card.

Double Flange Screed

Stow Mfg. Co. has recently developed a single beam, double flange vibrating screed useful for striking off narrow slabs such as sidewalks and prestressed concrete beams.

The new unit consists of a vibrating



Stow Double Flange Screed

unit driven by a 1 hp electric motor or 3 hp gasoline engine, which transmits the vibration evenly to two 3-in. wide steel screeding flanges. First flange strikes off concrete and second removes any air bubbles, the manufacturer states. The screed is lightweight, 145 lb. for 4 ft. length, and has adjustable amplitude of vibration. This facilitates maximum efficiency to suit any particular job. The unit is available in lengths of 4 to 12 ft.

Stow Mfg. Company, 312 Shear St., Binghamton, N. Y.

For more details circle 148 on Enclosed Return Postal Card.

Tractor-Mounted Rake

A heavy-duty tractor-mounted rake which combines rake, scarifier and grader blade in one compact unit is available from York Modern Corporation.

The new Model RH York Rake is designed for use on three-point hitch tractors. It rakes a swath from 7½ to 10 ft. wide, adjusts to five working posi-

York Model RH Rake

tions and may be angled to discharge material either to right or left. Rake grades and levels, screens out oversize material, spreads soil, gravel or crushed stone. Scarifier attaches to rake frame, adjusts instantly to either work or carry position. Working width is 6 ft. The grader blade clamps to the front of the rake teeth and operates in any of the five positions to which the rake may be set.

York Modern Corporation, Unadilla, N. Y.

For more details circle 149 on Enclosed Return Postal Card.

Compact Hoist

This new Series "S" Hoist from Euclid Crane & Hoist Company has recently been added to the company's line of electric hoists.

The unit features a one piece gear housing and frame of heavy steel. This is said to preclude any likelihood of misalignment or oil leakage. Complete

Euclid "S" Hoist

motor interchangeability permits the use of any Standard NEMA "D" flange-mounted Series 180 or 210 motor with integral disc brake. Capacities of the hoist run from 500 to 12,000 lb.

Euclid Crane & Hoist Company, Chardon Rd., Euclid 17, Ohio

For more details circle 150 on Enclosed Return Postal Card.

Wall-Hung File

A wall-hung file for handling and storage of blueprints, drawings and other large sheet materials is now available from Lewbill Industries, Inc.

Known as Martin Sheet File System, the unit allows sheets to hang flat, taking up minimum amount of room and eliminating curling, the maker states. Construction is of steel tube frame hinged to a plywood mounting panel, with locking hinge support arms. Model #30 holds up to 30-in. wide sheets; Model #42 holds sheets up to 42 in. wide.

Lewbill Industries, Inc., 68 Spring St., Scottdale, Pa.

For more details circle 151 on Enclosed Return Postal Card.

65-Ton Capacity Crane

A large diameter, wide roller path and extra strong king pin eliminates the need for hook rollers on the new Manitowoc Model 3400.

A 65-ton capacity crane convertible to dragline, shovel trench hoe and clamshell, the crane features overhead clearance height reductions of as much as 9 ft.; gantry can be quickly lowered without removing the boom, bringing the overhead clearance height down even farther. Various sizes of grooved steel laggings are interchangeable, providing a wide range of line pulls and speeds. Other features include torque converter drive, independent double drum boom hoist, box design crawler

Model 3400 Manitowoc Crane

frames, one-piece cast car body and a new, easy method for jack adjustment of crawler tension. Third drum for pile driving or similar jobs and other optional features are available.

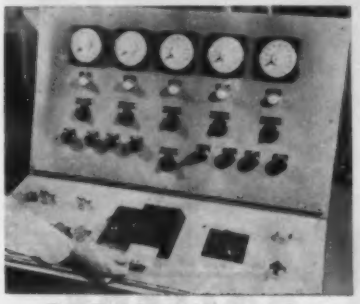
Manitowoc Engineering Corp., Manitowoc, Wis.

For more details circle 152 on Enclosed Return Postal Card.

Batch Plant Automation

A punched vinyl control card in the console of this automation control system is all that's necessary to activate batching operations. The unit is produced by Chain Belt Company.

An infinite number of mixes can be obtained with the punch card method. When card is inserted, a "reader" instantly interprets the instructions and the batching begins. By precisely controlling the weights of water, cement



Rex Punch Card Automation

and aggregate, mixing cycles and discharge time, guesswork and human error are removed from the process. The unit is built for ready mix and is not adapted from existing office automated control systems. The systems are available for portable or permanent plants.

A simple ticket punch is all that is needed to prepare the control cards, however, a special machine can be purchased to speed this operation.

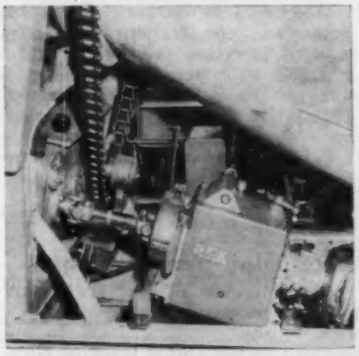
Chain Belt Company, 4701 W. Greenfield Ave., Milwaukee 1, Wis.

For more details circle 153 on Enclosed Return Postal Card.

In-Line Power Transmission

An all-new "in-line" power transmission system for Rex Truck Mixers is now offered by Chain Belt Company.

With the unit, power is transmitted from the truck engine to the mixer virtually in a straight line. Two angle-boxes and a chain take-up idler have been eliminated. The new transmission may be used with the popular front-end PTO or the flywheel PTO mounting. Double-reduction final drive is centered and out of the way; this location tends to prevent drum bounce on empty return runs and to ease chain takeup, the maker states. Built-in reduction of case permits the use of big pitch chain and large diameter drive sprockets for greatest chain life.



Rex Truck In-Line Transmission

In addition to the new transmission, two other Rex transmissions are still available which have been options for many years on Rex Moto-Mixers. These are the Rex 202 nonshifting, ultra-heavy-duty and the 101 shift type transmission.

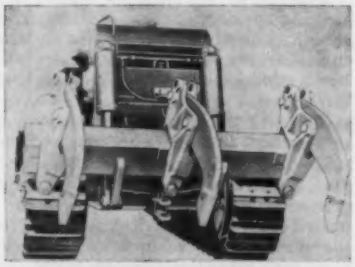
Chain Belt Company, 4701 W. Greenfield Ave., Milwaukee 1, Wis.

For more details circle 154 on Enclosed Return Postal Card.

Hydraulic Ripper

"The Brute", Greenville Steel Car Company's new hydraulic ripper for the International Harvester TD-25, was introduced recently.

The new ripper has adjustable shanks for various ripping depths and will penetrate 48 in. deep. Shanks swivel 15 deg. in either direction to allow points to "float" beneath the ground. Ripper weight and tractor



Greenville "Brute" for TD-25

Jay Tampers cut compaction costs "at least 90%" at Air Force Academy

More than 100 Jay Tampers were used by contractors who built the huge Air Force Academy at Colorado Springs. One of them, C. Wallace Plumbing Co., Inc., of Dallas, reports:

"Jay tampers reduced our compaction costs at least 90%. Dollar for dollar, they're the best equipment investment we ever made."

Savings on such jobs as the Interstate Highway Program and the Niagara Power Project are similar. In one case, the cost per cubic yard was cut from $2.68 to 12c.

Even greater savings are now available with Jay's new models, which tamp harder, faster, better on all soils and blacktop. Improvements include stepped-up power, new handles, and a new trailer for easy transport.

See your Jay dealer for a free demonstration, or send for new Catalog J-O. Jay Company, Division of J. Leukart Machine Co., Inc., 2228 South Third Street, Columbus 7, Ohio.

JAY tampers

. . . for more details circle 342 on enclosed return postal card

New Products

weight are balanced, resulting in greater traction and more usable horsepower, the maker states. Included in the new designs are straight shanks in 24 in., 42 in. and 48 in. digging lengths; curved shanks in 24 in. lengths for use in non-blocky or non-slabby materials; and a new push-block which can be attached straddling the center shank and swing beam for booster ripping. Pipeline and cable laying shanks are also available.

The Greenville Steel Car Company, Earthmoving Equipment Division, Greenville, Pa.

For more details circle 155 on Enclosed Return Postal Card.

Vacuum for Drills

For use in all types of dry or wet drilling applications, the Pullman Vacmobile, a product of the Pullman Vacuum Cleaner Corporation, is said to handle indoor or outdoor jobs on concrete marble or stone.

The unit has no outside bag to snag or tear and features a secondary filter said to resist finely ground alkali and dust, particles and chunks of stones and granite. The hose for the unit is connected directly to the drill as shown in the photo. The vacuum comes complete with accordion hose, tools "Never Clog" filter. Two models can be quick-

Pullman Vacmobile

ly converted to blowers, the maker states. Other specifications include: 115 v., 0 to 60 cycles, ac-dc, odd voltages available upon request. Available in three models with various horsepower-JB90-¾ hp. JB252-1¼ hp. JB365-1½ hp.

Pullman Vacuum Cleaner Corporation, 25 Buick St., Boston 15, Mass.

For more details circle 156 on Enclosed Return Postal Card.

Automatic Weather Cap

A new version of the Weathercap, an automatic exhaust cover for engines with vertical exhausts, has been announced by the Anthes Division, Gleason Corporation.

Anthes Weathercap

Arc welding has been eliminated from the unit, and a projection weld used on the weight to the lid. This is said to provide greater strength by spreading the weld over a greater area. The cap is available in a range of sizes to fit 1 7/16 in. to 6 7/16 in. exhausts.

Anthes Company, Fort Madison, Iowa.

For more details circle 157 on Enclosed Return Postal Card.

Transit Mixers

A new line of Transcrete transit mixers available in steel and all-aluminum models has been announced by Construction Machinery Company.

The units feature flared drum design with 25 percent deeper end blades to provide fast, smooth discharge of even

INGRAM

IN ACTION

3 WHEEL AND TANDEM ROLLERS

INGRAM 12 ton 3-wheel roller rolls hot coarse grade asphalt directly behind bituminous paver on North Loop 13, San Antonio, Texas.

INGRAM 8-12 ton tandem roller works in background.

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Transcrete Mixer

the lowest slump mixes. Flaring the drum at the discharge end gives the mixers a large 40 in. drum opening to get mix out faster with no capacity reduction. Swing-out hopper moves completely out of the way for discharge to further facilitate fast discharge. Other features include an automatic wash-down system, single level operating control and optional automatic measuring water tank.

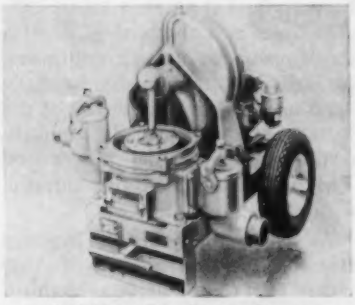
Construction Machinery Company, Waterloo, Iowa.

For more details circle 158 on Enclosed Return Postal Card.

Diaphragm Pump

McGowan Pumps has announced the development of a new, heavy-duty ball valve diaphragm pump for pumping of sludge and other solids-bearing liquids prone to clog pumps.

A specially weighted neoprene ball valve is said to give a forceful, positive closing that insures greater pumping



Ball-Type Diaphragm Pump

efficiency with difficult-to-pump viscous liquids. Ball valves have replaceable seats to extend to 6,000 gph. Available in 3 in. or 4 in. sizes with either electric motor or engine drive, the pumps can be mounted on steel wheels or pneumatic tires.

McGowan Pumps, Division of the Leyman Mfg. Corporation, 3400 Central Pkwy., Cincinnati 25, Ohio.

For more details circle 159 on Enclosed Return Postal Card.

Pneumatic Vibrator

A new high speed pneumatic external vibrator is announced by Viber Company.

With simplified construction and a

Viber Co's "TurboViber"

turbine wheel for its power source, the unit is said to have exceptional bearing capacity and is known as the "Turbo-Viber". Driven by a turbine wheel, the vibrator requires no vanes or cylinders and there is no sliding friction, the maker states. Five mounting methods facilitate ready application to many vibrating operations.

Viber Company, 726 Flower St., Burbank, Cal.

For more details circle 160 on Enclosed Return Postal Card.

Oil Test Kit

The Gerin Corporation announces a new Model PK4 crankcase Oil Test Kit, in step with the present day tendency to make lubricating oils with more and more detergency.

The manufacturer claims an exclusive feature of the kit, which does not use blotters, is the ability to show the definite amounts of contaminants and

Gerin PK4 Test Kit

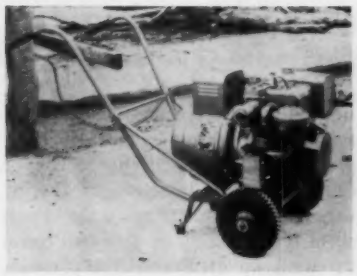
deterioration of the oil. The tests show whether or not to change oil or filter and whether an engine needs attention because of fuel or water or metal particles found in the oil. Any mechanic or operator can test for fuel dilution; water and anti-freeze leakage; acidity; metal particles; dirt; soot; etc. in one to twelve oils at the same time.

The Gerin Corporation, Avon, N.J.

For more details circle 161 on Enclosed Return Postal Card.

180 Cycle Generator

A new 2,500 watt, 180 cycle engine



Winco 180 Cycle Generator

generator has been introduced by the Wincharger Corporation, a subsidiary of Zenith Radio Corporation.

The portable electric power plant features long brush life and low maintenance cost, the manufacturer states. They incorporate Winco's "Automatic Conserv-er," an idling control reported to save up to 60 percent in fuel cost. This unit provides 2,500 watts of 180 cycle 3-phase, 230-v a.c. power; as well as up to 1,500 watts of 100-v d.c. power. The generators are powered by Briggs & Stratton 4-cycle engines. A max-min speed control is adjustable for performance with low or high slump concrete.

Wincharger Corporation, Subsidiary of Zenith Radio Corporation, Sioux City 2, Iowa.

For more details circle 162 on Enclosed Return Postal Card.

Impact Crusher

Rogers Iron Works Company announces the manufacture of a single rotor impact crusher.

Available in 38 in. by 50 in., 46 in. by 54 in. and 56 in. by 60 in. feed opening sizes, these machines have a specially-designed lower chamber which permits any larger piece passing through the feed opening to be crushed without bridging. The crusher is also

Rogers Single Rotor Crusher

able to handle feeds containing a large porportion of mud which would normally clog machines of the type, the manufacturer states. Maintenance expenses are reported to be at a minimum. Capacities range from 250 to 1,200 tph. These units are available as portable, semi-portable or stationary models.

Rogers Iron Works Company, 11th and Pearl Sts., Joplin, Mo.

For more details circle 163 on Enclosed Return Postal Card.

Continued on page 223

MISSISSIPPI MEETING

Continued from page 164

new estimate of the cost of the Interstate program—wanted by Congress in 1961—reflects this feeling of criticism. (The instructions are for the state engineers to scale down certain standards, in order to come up with an estimate that presumably will not show much further increase in the "I" program's cost.) Fewer interchanges, fewer lanes near and in cities, are some of the economies. Johnson reminded the state engineers that the values set forth in this manual are, however, recommended optimums—additional interchanges and lanes are not banned, if they can be supported.

"It is my hope," he said, "that the state engineers will design their roads with the features they conservatively feel to be in the public interest." Reducing interchanges to half the number formerly planned for Interstate highways, as is now in the wind, may turn out to be a costly piece of shortsightedness.

Coming back to the Ways and Means Committee, this is a very objective one, said Johnson. It has asked the states how the Interstate program cost could be cut. Of the replies, 32 said, "can't cut," eight suggested minor reductions. The Interstate highway costs as presently planned run 16 percent for right-of-way, 22 percent for grading and minor structures, 20 percent base, paving and shoulders, 40 percent for bridges and other major structures, and 2 percent for minor items such as fencing, lighting, signalization.

One suggestion made is to eliminate full access control for all "I" sections carrying less than 8,000 vehicles per day. This is 29 percent of the rural Interchange mileage. This economy, which "might soon be seriously regretted," would result in only a 4 percent saving in the overall Interstate road program cost.

"All the economies suggested add up to a saving that is so little," said Johnson, "that it could be lost within the accuracy of the estimate."

The engineers will have to justify their costs, of course, it was noted. An interchange doesn't add a mile of road. Its cost must meet a real justification, and the engineers should have on file data to prove it. Johnson indirectly quoted federal highway administrator Tallamy on this point.

John H. Swanberg, president-elect of the Mississippi Valley Conference of State Highway Departments. Mr. Swanberg is chief engineer, Minnesota Department of Highways. He succeeds Walter Johnson, State Highway Engineer of Kansas.

The third Washington committee, which is causing concern, is the one set up under Congressman Blatnik. Bypassing the subcommittee on roads of the House Public Works Committee, this new group is composed of various people in Congress who have a highway interest. It has a good investigative staff, and its intent is to look into a wide range of matters. It is now divided up in teams, who are out in the states. Navigation clearance for waterway bridges is one topic it will study.

In this political year, this committee's press releases have made headlines about "widespread scandal." The AASHO has asked the committee to stay within the purposes chairman Blatnik announced for it at the AASHO convention at Boston last fall. "Nothing the committee can do will offset the harm that it can cause by the bad publicity from exaggerated and unfounded claims of graft, waste and corruption," said Johnson. The committee meanwhile is said to be digging in on such subjects as the role of consultants in the program, alleged collusion in bidding, irregularities in right-of-way acquisition, how pavement types are selected, non-uniformity of BPR policy administration in the states, and other subjects. There is said to be personal differences and bitterness within the committee ranks over these activities.

"As a result of this kind of activity," said Johnson, "some of the Bureau people in the various districts are 'running scared.'" He noted that the Bureau is, after all, a reviewing agency of the federal government and therefore has considerable red tape built into its procedures. In the anxiety to sidestep trouble, right now some Bureau offices are getting into activities that have created a strained relationship with state highway departments. Johnson took this occusion to urge everyone to relax a bit. "Don't yell before you are hurt," he said. And state people should not feel hurt if some of their long-established prerogatives are stepped on right now.

Also don't be stampeded into wastefully building up unnecessarily detailed records, just for fear that some committee will want the facts. "Go back to your main job of building the roads," urged Johnson. The federal-state relationship has survived through a lot of difficult times and the settlement of a lot of problems of relationship and procedure. Many compromises have been necessary in the history of the Bureau of Public Roads' administrative and reviewing procedures. The public usually comes out the winner, he said.

As a final admonition Johnson said that 1961 is the year of decision. "Don't be so naive as to think that Congress when it meets then will turn everything over to you." The state highway engineers can no longer maintain this provincial point of view. Their task more than ever is to keep local Congressmen posted, with the knowledge that important decisions will be made in Washington but that these can be made to reflect grass-roots highway needs.

So, keep your Congressman informed, ended this speaker. Keep the highway needs in mind. And keep confident. "The states will finish the program, and will do it with distinction."

More No-Passing Signs For Iowa Roads

By late fall of 1960, Iowa motorists are expected to have the services of 7,500 additional pennant-shaped no-passing zone warning signs erected along 73 additional Iowa primary roads. The signs costing about $100,000 were advertised for bids to supply blank plates to the Commission's sign shops.

Iowa is reported to be the only state using this particular pennant-shaped, left-of-road no-passing sign. The 1958, Commission safety and traffic engineers proposed a trial of such signs to help reduce no-passing violations and to increase safety in passing. Past experience had shown that the yellow no-passing lines near the center of the road were frequently hidden from the motorists' view due to vehicles ahead or because the lines were obscured by snow, dirt or wear.

The new left-side no-passing sign offers drivers an unlimited opportunity to detect no-passing zones even when yellow line markings are hidden from the driver's view.

In December of 1958, nearly 600 of the new signs were placed on US 30. Public acceptance of these new signs was so enthusiastic, according to a Commission bulletin, that more were erected in 1959.

Speed Chief Reason for Turnpike Arrests

Altogether 15,301 arrests were made in the 1959 operation of the Ohio Turnpike. As detailed in the Turnpike Commission's Annual Report, excessive speed heads the list of reasons, with 1,184 arrests of commercial and 10,644 of automobile drivers.

Next commonest reason for arrest was "following too closely" (truckers being principal violators), and also near the top of the list were insufficient or no lights, lack of safety equipment, reckless operation, and lack of proper driving license. The complete picture is described in the turnpike Commission's Annual Report.

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SCHLUETER MFG. CO. St. Louis, Mo.

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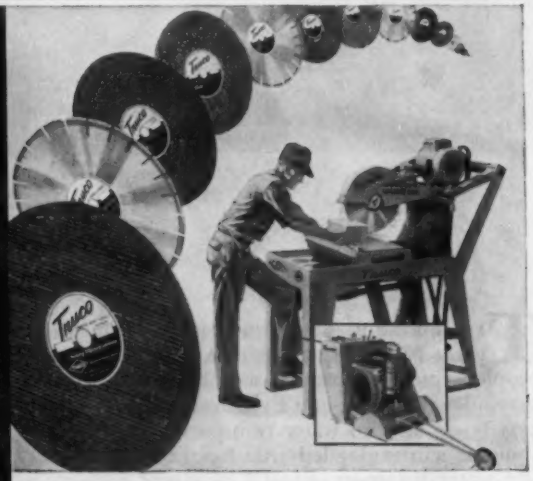

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Alaska Road Work Difficult and Costly

Contractors who venture Alaska work had better know costs and problems

By R. L. Peurifoy
Construction Consultant

Transportation is a critical item in the future of giant 580,000-square-mile Alaska. Its 220,000 people centered mostly along the southern coast have a few highways and a railroad line but depend heavily on air and water transportation—often air alone or winter dogsled. Air freight-ins are costly, and water transport (coastal or river) necessarily limited, slow and expensive. Highways are a big and serious need in this vast region's development.

Just how roundabout water transportation can be is shown by the case of a steel bridge which was dismantled in Fairbanks in 1958. Its destination was Nome, some 500 miles west (no highway). The bridge went by rail 400 miles south to Seward, then by sea down to Seattle, where—the following year—it was re-shipped by water back North to Nome.

If Alaska is to sustain population growth and develop its natural resources, more extensive transportation facilities will be necessary. Highways appear to be the most logical. Presently Alaska has about 4,500 miles of roads, including about 1,200 miles paved. Most of these are in the southeastern area. The quality of the unpaved roads varies from well-maintained gravel to poorly-maintained earth. Owing to the severe winters, with heavy snowfall in many areas, it is not practical to keep all roads open to traffic on a 12-month basis.

Why Costs are High

Highway construction in Alaska is expensive, with costs sometimes running two to three times that of similar work performed in other states. In southeastern Alaska the rugged terrain, dense for-

Mr. Peurifoy recently returned from a 14-month assignment with the Bureau of Public Roads in Alaska as a construction engineer.

Producing gravel for a highway fill from a borrow pit at tide level, along the bay north of Juneau. Aggregates are plentiful for most Alaska road locations.

ests, muskeg soil conditions, plus 100 inches or higher annual rainfalls along some locations, make highway construction very treacherous and expensive. For example, clearing and grubbing the right of way may cost $5,000 or more per acre. Unclassified excavation and borrow may cost as much as $1.50 per cu. yd.

On one project in southeastern Alaska the cost of a one-lane gravel-surfaced road, with passing turnouts at intervals, was just over $100,000 per mile. The natural ground along this project was primarily muskeg, some of which was so deep that a man could force a steel rod to 10 ft. depth by merely an easy manual push.

Operating construction equipment over such soil was extremely difficult or impossible. The trees, which were thick, varied and up to 5 ft. in diameter, were felled with chain saws, then stacked for burning. Because of the large sizes of some of the trees, it was frequently necessary to split the stumps with explosives prior to pulling them. Burning was slow and expensive.

For road sections built directly on undisturbed ground, gravel for fill was trucked over gravel previously placed, dumped, and dozed ahead. Owing to the instability of the muskeg base, subsidence was very high, with the actual gravel quantities required to bring the roadbed to the specified grade exceeding the estimated yardage sometimes by 100 percent.

Corrugated metal pipes installed prior to constructing the roadbed frequently floated to the embankment surface. This was caused by the kneading action of trucks moving over the highly saturated spongy gravel. It was necessary to remove the pipes and reinstall them after the embankment had become more stable.

In the Alaskan interior construction conditions

Table 1.
Representative Minimum Wage Rates for Alaska Road Work

Crafts:	Per hour
Carpenters	$4.25
Cement masons	4.26
Ironworkers, reinforcing	4.35
Ironworkers, structural	4.56
Painters, structural steel	4.00
Piledrivermen	4.295
Power equipment operators:	
Batch plant	4.34
Bulldozer	4.31
Cranes:	
"A" frame trucks, double power drums	4.75
Crawler and truck type, over 3 yd.	5.08
Crusher, rock	4.39
Derricks	4.70
Loaders, front end	4.70
Mixers, asphalt	4.24
Motor patrol graders	4.39
Oil distributors	4.70
Piledriver engineers	4.41
Rollers on plant-mix material	4.34
Scrapers, carryall type, single	4.31
Shovels, crawler and truck type, 3 cu. yd. and under	4.75
Truck drivers:	
Dump truck, up to 5 cu. yd.	3.86
Dump trucks, 5 to 12 cu. yd.	4.09
Dump trucks, 12 to 20 cu. yd.	4.21
Ready mix trucks, 3 to 5 cu. yd.	4.09
Ready mix trucks, over 5 cu. yd.	4.21
Laborers:	
Asphalt	3.73
Building	3.73
Clearing and grading	3.73
Concrete	3.83
Jackhammer	4.09
Wagon drills	4.09

usually are less severe than in the southeast, with a few exceptions. Rainfall is lighter, trees smaller, and because many of the roads follow valleys, the terrain is more nearly level. Fortunately natural gravel, or rock suitable for crushing, is usually available with reasonable haul. Clearing and grubbing may cost as low as $200 per acre, but usually higher. Unclassified excavation and borrow may cost as low as 85¢ per cu. yd. under favorable conditions. However, highways cannot always be constructed along favorable locations, if they are to serve given communities or areas. Even in the interior, to route the road through muskeg and over mountains means higher costs.

Permafrost Problem

A condition frequently encountered during construction in the interior is permafrost. Depending on the latitude, elevation, and season, the earth may be frozen from the surface or near the surface to depths of many feet. Under such conditions excavation is extremely difficult and expensive. On one project, northwest of Fairbanks, the contractor started his earthwork early in June, 1958. As soon as he removed the vegetation and a few inches of earth he encountered permafrost. After an unsuccessful effort to rip the frozen earth he abandoned the section temporarily, and moved to another section. As soon as the earth thus exposed to sun and air in the first section had thawed sufficiently deep, he returned to it to remove additional earth. This procedure was repeated until the earth was excavated to the specified depth.

On a project north of Nome the roadbed was constructed by placing a gravel fill directly on the undisturbed natural ground, with the vegetation left in place. Since the vegetation consisted of moss and scattered low shrubs, this procedure did not present any difficulties. Again, the gravel was trucked over roadbed previously dumped and pushed ahead with bulldozers.

Bridges a Special Problem

Bridges in Alaska usually consist of concrete-capped steel piles, steel girders and concrete decks. Because some bridges must be designed for locations where adequate information on soil conditions is not available, it is not uncommon to find conditions quite different from those expected.

This lack of dependable information makes it very difficult to make accurate estimate of pile lengths needed to develop the specified load carrying capacities. Since a contractor must place his order for piles well in advance, for delivery from outside, this uncertainty may present a problem. He may wind up needing longer piles than he has on hand. The Bureau of Public Roads stocks limited quantities of steel piles at certain locations, from which a contractor may purchase or borrow additional piles if they are needed.

For two bridges constructed near Sitka, the estimated pile length was 45 ft. This length proved to be right for one bridge, but the first pile for the second bridge had to be driven 130 ft. to develop the specified supporting capacity. The installation of core stoppers on the second pile driven permitted a reduction to 127 ft. After the second pile had been driven the remaining piles were reconstructed by attaching heavy steel plates to them, forming one pyramid for each pile.

A modern deck being placed on a new bridge spanning the Chilkab River, 24 miles from Haines, Alaska. Old timber bridge replaced, half-width at a time, to maintain traffic.

Blasted rock needed for rip-rap north of Juneau. Note heavy forest covering which prevails in southern coastal area.

Working in the rain to place a multi-plate corrugated iron culvert on an Alaskan project.

REPLACE AND SAVE WITH . . .

Flexonics

Free-Flowing

TAR & ASPHALT HOSE

- Heat-Proof
- Leak-Proof
- ¾" up to 12" I.D.
- Hose & Fittings to meet all equipment needs.

SUPER STRENGTH
FOUR WALL
CONSTRUCTION

Asbestos packed, interlocked construction . . . provides maximum flexibility.

USED AS ORIGINAL EQUIPMENT

IH 376

FLEXONICS CORPORATION
1423 S. 3rd Ave., Maywood, Ill.
Subsidiary of Calumet & Hecla, Inc.
Send me complete T&A hose data and name of distributor nearest me.

Name_____
Company_____
Address_____
City_____ Zone____ State_____

. . . for more details circle 312 on enclosed return postal card

For another bridge built southwest of Fairbanks, piles were estimated at 45 ft., but 85 ft. lengths found necessary.

Representative unit prices for bridge items are: concrete, $150 to $200 per cu. yd.; reinforcing steel, $0.30 to $0.50 per lb.; structural steel, $0.40 to $0.50 per lb. Bridges of the type specified cost about $1,000 per lin. ft. depending on the location.

Plans for Future Highways

At the present time consideration, with varying degrees of interest, is being given to a long-time program involving eight chief projects: Petersburg, through British Columbia to the Alaska Highway (in Alaska, 55 to 60 miles); Juneau through British Columbia to the Alaska Highway (in Alaska, 35 to 40 miles); Cordova to Chitna, connecting with existing highways (adding 65 to 70 miles; Nenana to Mt. McKinley National Park (65 to 70 miles); Talkeetna to Mt. McKinley Park (adding 75 to 80 miles); Nome to Fairbanks (adding 500 to 550 miles); Nome to Anchorage (600 to 650 miles); Circle to Eagle (125 to 140 miles).

This adds up to 920 to 1,010 miles depending on detailed location.

Federal-aid funds available to Alaska from the Bureau of Public Roads are $36,000,000 per year, requiring about $5,000,000 yearly matching funds. Assuming 25 percent for engineering and administrative expenses, leaves about $30,750,000 per year for construction.

Bridges comprise a costly item in Alaska road planning. Pile lengths are difficult to estimate, for one thing. Remote locations make move-in costs high.

Construction cost will vary from about $20,000 per mile for minimum-standard roads, constructed under favorable conditions, to in excess of $100,000 per mile for high-standard roads under adverse conditions. Hence funds in sight will support the following each year:

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IF WACKER IS IN THE PICTURE

MODEL GVR 100-C RAMMER
- Lightweight — 115 lbs.
- 450 to 650 blows per min
- Meets toughest compaction tests
- Shock absorbers — NO operator fatigue

Compacts an area of 20 square feet per minute with lifts of 8 to 16 inches. Ideal for compacting all types of material such as clay, earth, sand and bituminous material.

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ONE MAINTENANCE TEAM will do the work of two with
KOTAL
Bituminous
STOCKPILE MIX

Save Time and Money — Get Longer Lasting Results — Patching Jobs Last With Kotal! No repeat repairs. Easy to use — at any time — under any conditions when men can work.

Here's why you can do more maintenance work and do it better with Kotal Stockpile Mix
- It's tough, more stable and more durable
- It's cohesive and adhesive
- It resists stripping and destructive action of water
- Asphalt retains its life far beyond normal length of time
- It's easily laid with ordinary tools and equipment
- It remains workable in stockpile and is readily available the year 'round
- It is easily transported as needed
- Patching can be done under any weather conditions
- Stretches your maintenance period over entire year
- Consolidates readily under traffic

Get the complete story, write to:

KOTAL Company
119 SUMMIT AVENUE • SUMMIT, N. J.

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Table 2.

Selected Unit Prices, Highway Construction in Southeastern Alaska

Estimated quantity	Description	Unit price
43 acre	Clearing land	$3,000.00
23 acre	Grubbing	2,000.00
44,000 cu. yd.	Unclassified excavation	1.80
134,000 cu. yd.	Borrow excavation	1.80
1,050 cu. yd.	Excavation for structures	8.00
100 cu. yd.	Excavation for structures, bridges	10.00
15,000 sta.-yd.	Overhaul	0.10
142,000 yd.-mi.	Overhaul of borrow	0.40
1,400 lin. ft.	10BP42 steel piles, furnish	5.00
38 each	10BP42 steel piles, driven	150.00
6 each	Splice steel piles	80.00
259 cu. yd.	Class A concrete	170.00
57,160 lb.	Reinforcement steel	0.20
3,562 lin. ft.	18 in. asbestos bonded cor. metal pipe	10.00
326 lin. ft.	24 in. asbestos bonded cor. metal pipe	13.50
110 lin. ft.	30 in. asbestos bonded cor. metal pipe	16.50
232 lin. ft.	36 in. asbestos bonded cor. metal pipe	24.00
52 lin. ft.	48 in. asbestos bonded cor. metal pipe	32.00

Average Cost Per Mile	Number of Miles Constructed
$ 40,000	768
60,000	512
75,000	410
100,000	307

One community wanting a connection with the existing state highway system is far-western Nome (2,000 population). If a highway is constructed from Nome to Fairbanks, it probably would connect with an existing low-standard road extending from Fairbanks to Eureka. The additional length required would be about 510 miles. Several rivers, including the Yukon, would have to be crossed. Because of the terrain, climate, remoteness from supply centers, and short construction season (3 to 3½ months), the job could run to $75,000 per mile, for a total of $38.3 million plus $10 million for bridges. Engineering and administrative costs would bring this link to $60 million. Since there appears to be little prospect for substantial development or growth of communities along the way, the primary service would consist of providing road transportation between Nome and Fairbanks.

Maintenance Also High

The average cost of maintaining highways in Alaska is about $1,000 per mile per year. A road if built from Nome to Fairbanks (open four months per year) would need perhaps $500 per mile per year.

Let us examine the economics of constructing and maintaining the proposed Nome-Fairbanks road. Considering interest cost only at 4 percent, plus maintenance, the annual cost of providing this road would be as follows:

Interest, 0.04 x $60,000,000	=	$2,400,000
Maintenance, 510 miles x $500	=	255,000
Total cost per year	=	$2,655,000

Alaska Asks for Special Highway Aid

Alaska Governor Egan has proposed a 15-year highway development program based on obtaining $300 million in special road appropriations from the federal government.

U.S. Senator Gruening said Alaska is due such a special highway allocation to make up for the more than 40 years it was omitted from federal road aid programs during its territorial days.

Egan said he had suggested that Gruening seek Congressional authority for annual appropriations of $20 million over the 15-year period, beginning July 1, 1962. For the first five years, Alaska should seek authorization to use not more than $5 million of each annual appropriation for road maintenance purposes. Another $3 million should be available during the time for construction of farm and access roads, with the remaining $12 million annually going to primary roads.

Egan also suggested that at the end of the first 5-year period, the state should assume all maintenance costs, with the entire proposed $20 million annual allocation going for major highway construction. Such use of special funds would avoid crash handling of expanded highway money and permit orderly development of a new road network in the state.

Alaska's melting snows and summer-long mud make survey and get-in difficult in highway work. Photo courtesy Tuttle Engineering, Inc., which recently has had an expanded work force in Alaska.

Table 3.

Cost of Providing Highway Service from Nome to Fairbanks

No. of vehicles		Vehicle cost	
Per day	Per year	Per trip	Per mile
10	1,200	$2,210	$4.34
20	2,400	1,105	2.17
40	4,800	553	1.08
60	7,200	369	0.72
80	9,600	277	0.54
100	12,000	221	0.43

While it is impossible to estimate accurately the traffic density, it probably would be less than 100 vehicles per day, possibly as low as 40 to 50. Table 3 gives the cost per vehicle for the full trip, and the cost per vehicle-mile, for use of the highway for various numbers of vehicles per day. The results for 20 vehicles per day for 120 days per year are calculated as follows:

Number of vehicles per day, 20
Number of vehicles per year, 2,400
Cost per vehicle trip, $2,655,000 ÷ 2,400 = $1,105
Cost per vehicle-mile, $1,105 ÷ 510 = $2.17

If it is assumed that the highway will have a useful life of 50 years, the entire cost should be distributed over a 50-year period. Since this amounts to 2 percent per year, the inclusion of this additional cost with the previously developed annual cost would have the same effect as increasing interest to 6 percent. Thus the unit costs appearing in Table 3 would be increased by nearly 50 percent.

The selection of the highway from Nome to Fairbanks is not intended to imply that consideration for constructing this road should be abandoned in favor of other roads. The information given in Table 3 can apply equally well to other highways under consideration, and to some which are now in existence. Providing highways in Alaska for locations where construction costs are high and traffic densities are light can be expensive.

Courtesy Room for Virginia Lettings

A "Courtesy Room" for use by roadbuilding contractors and their guests was set up in a Richmond hotel for use during a recent Virginia highway letting.

The room was equipped with a direct line phone to the highway department building, and as bids were announced at the department they were relayed by phone to the hotel where they were called off and tabulated on a blackboard. Contractors and guests were served coffee and donuts during the letting.

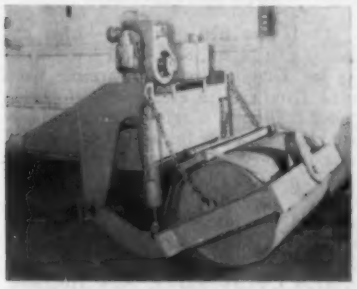
The room was sponsored by five Richmond equipment firms. Sponsors have announced that the "Courtesy Room" will be open for roadbuilding contractors and their guests at all forthcoming highway lettings.

New Products

Roller Attachment

An improved version of the GraderolleR, the Model GR-42HG, featuring an independent gasoline-driven hydraulic pump is available from the Martin Company.

The new unit mounts a Wisconsin Model BKN single cylinder air-cooled gasoline engine on the top of the roller frame. Developing 7 hp at 3,600 rpm, the engine is connected directly to the hydraulic pump, a Barnes rotary gear



Martin GraderolleR Attachment

pump with 6 gpm capacity at 1,500 psi.

The GraderrolleR uses the weight of the grader to exert up to 225 lb. of compaction per linear inch of its 42-in. wide roller. The roller is pivoted at the center and follows the road's surface regardless of the grader's position during operations, the maker states. There is said to be no transportation problem as the entire 2,000 lb. unit attaches to the rear of the motor grader where the tandem wheels can evenly distribute the full weight.

Martin Company, 620 Andrews St., Kewanee, Ill.

For more details circle 164 on Enclosed Return Postal Card.

Power Tamper

Kelley Machine Division announces the addition of a new model power tamper to its regular line.

It is the model 18 KTH, a heavy duty power tamper with an 18 in. shoe, which will be offered in conjunction with Kelley Power Tamper Models 18 KTL (18 in. shoe) and 36 KTH (36 in. shoe). All tampers are equipped with roller-bearing engines driving massive eccentric loaded rotors. When the eccentric rotor system is operated at the recommended speed, the whole machine is picked up, moved forward, and rammed down in short, rapid, continuous cycles. The resulting high-magnitude downward vibratory forces are transmitted by the underlying soil particles in all directions, thus rearranging these particles to a densely compacted and interlocked mass. The units are self-propelled and move themselves forward up to 80 fpm. The 18 in. shoe model can tamp up to 5,400 sq. ft. per hr.

Kelley Power Tamper 18 KTH

Kelley Machine Division, 285 Chicago St., Buffalo 4, N.Y.

For more details circle 165 on Enclosed Return Postal Card.

Vibratory Power Roller

The new Littleford Model 125-V "Vibra-Topper" vibratory powered roller produces more compaction density than offered by an 8-ton dead weight roller, states the producer, Littleford Bros., Inc.

Littleford 125-V Roller

The vibratory portion is controlled by a separate clutch so that the unit may be used as a 1-ton static roller for black top or an 8-ton vibratory roller for base rolling. It produces 2,600 lb. of thrust for maximum compaction.

Littleford Bros., Inc., 457 E. Pearl St., Cincinnati 2, Ohio.

For more details circle 166 on Enclosed Return Postal Card.

Power Steering Hose Lines

Replacement hose lines for power steering units are so numerous as to make it impractical to keep a stock on

Aeroquip Power Steering Kit

COMMENT
from the
BUTLER ENGINEER

. . . of unbelievable accuracy in tunneling . . . and a Star at the Ready Mixed Show

A really great engineering feat! Blue River Constructors have just completed the boring operation for the Roberts Tunnel under the Continental Divide. But man, that hole is 23.27 miles long. Bored from both sides—and when the two crews met in joining they were only 1¼" off sideways and only 2" from top to bottom! 23.27 miles is 1,474,388.04 inches. Percentage wise the margin of error is 1.25 ÷ 1,474,388.04. Aw, you figure it. My slip-stick can't squat that low.

And we're no end happy to report that the equipment to line the tunnel with concrete will be by Butler.

•

Highly automated equipment shown at the Ready Mixed show. All of it good, too.

But Butler Bin popped up with a great new advance in a control system. Designated as the SP, it requires only setting two dials and touching one push button for a complete batching operation.

Mix selections are obtained by what we call a Mix Capsule. Any number can be used. Set another dial called the Batch Splitter to get the amount of any mix you want in increments of ¼ cu. yds.

The SP is so completely automated, so thoroughly interlocked and so darned simple it's absolutely fool pr——(no, I don't like that word.) Let's call it absolutely human-proof.

Not by our vote — but by the concensus of hundreds of Ready Mix owners attending the Show, Butler is again a great big step ahead of all the rest. Write for the SP Bulletin.

The Butler Engineer

BUTLER BIN COMPANY
WAUKESHA, WISCONSIN

. . . for more details circle 287 on enclosed return postal card

hand. To solve this problem, the Aeroquip Corporation has developed Power Steering Kit #5190.

The kit contains a coil of Aeroquip 2555 power steering hose and a variety of reuseable fittings, everything needed to make hydraulic pressure and return lines for power steering units. Only equipment necessary is a wrench and a vise. Instructions are illustrated inside the cover of the kit, and parts are identified to facilitate re-ordering of individual fittings, adapters and hose.

Advertising Department, Aeroquip Corporation, Jackson, Michigan.

For more details circle 167 on Enclosed Return Postal Card.

4-Wheel Drive Tractor

A new four-wheel drive, four-wheel steer NAPCO Crab tractor was announced recently by NAPCO Industries, Inc.

NAPCO Crab Tractor

The unit features a six cylinder gasoline engine offering 72 hp. and the 12-v. electrical system and location of battery under the floor plate. Four wheel hydraulic power brakes, torque converter, power steering, hydraulic reversing clutch and heavy-duty axles are standard equipment. Improvements include increased capacity for fuel tank, radiator and hydraulic supply tank, hydro-vac power brakes, doubled capacity for torque converter heat exchanger.

Construction Equipment Division, NAPCO Industries, Inc., 834 N. Seventh St., Minneapolis 11, Minn.

For more details circle 168 on Enclosed Return Postal Card.

One-Man Trencher

The Arps Corporation announces the development of a new, one-man operated trencher, the Model MA-2 Trench Devil.

The unit is designed for use as a low-cost heavy duty trencher for a wide variety of jobs such as gas lines, water services, foundations, street lighting, electrical cable and sprinkler systems. Weighing approximately 1,080 lb. the unit can be easily transported or moved under its own power at 3 mph; safety switch automatically stops machine if operator's hand is removed from controls.

Arps MA-2 Trencher

There are five digging widths: 2¾ in., 3½ in., 4 in., 6 in., and 8 in. up to 54 in. Digging speed is variable from 0 to 1,200 fph in either direction. At the 2 ft. depth, digging speed averages 205 fph at an 8 in. width. One side dirt delivery is accomplished by a reversible rubber-belted conveyor which can be changed to either side within 60 seconds, the manufacturer states. One crumber can be used for 2½ ft., 3½ ft., and 4½ ft. booms.

Arps Corporation, New Holstein, Wis.

For more details circle 169 on Enclosed Return Postal Card.

Carry-File for Plans

Lightweight, compact and rugged, this new carry-file, the "Roll-Pack", is

SAND BLAST

the easy RUEMELIN way!

A practical Sand Blast Generator for all types of outdoor cleaning work. Removes rust scale, paint. Cleans bridges, removes laitence from cement. Cleans ready-mix trucks and highway equipment prior to re-painting. Equipped with remote control with deadman valve for stop and start *at the nozzle!* Wet type nozzles also available if desired. Portable units can be equipped with hi-speed mountings for highway trailing.

Write for descriptive bulletin.

RUEMELIN MFG. CO.

1990 N. PALMER STREET MILWAUKEE 12, WIS., U. S. A.

MANUFACTURERS AND ENGINEERS — SAND BLAST AND DUST COLLECTING EQUIPMENT — WELDING FUME COLLECTORS

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CONCRETE PROFITS INCREASED

TK TREATMENT saves time and money. Cures, Seals and Hardens concrete in one operation. Insures complete protection of green concrete through the critical period.

NO MORE

- Burlap to moisten
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- Curing membranes to agitate
- Sandblasting before painting or sealing joints

Spray on just one coating of TK TREATMENT for rainfall protection within 30 minutes—provides up to 98% moisture retention—remains as a part of the concrete to repel salts, greases and alkalies.

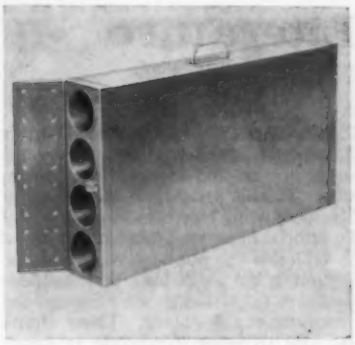
TK TREATMENT is a specially formulated chlorinated rubber compound that meets ASTM-C-156-55T, C-309-53T; AASHO Designation M-148; CRD-C-300 and CRD-C-302. Test reports furnished upon request. Get complete details from your TK representative or write to:

W. F. MACKLIN COMPANY, INC.

Dept. RS

336 Taft Street, N. E. Minneapolis 13, Minnesota

. . . for more details circle 345 on enclosed return postal card



Plan-Hold Carry File

available from Plan Hold Corporation.

The file consists of four durotubes mounted in a steel housing with a spring-latch door. The tubes are 2⅝ in. in diam. and 23½ in. long. The housing is equipped with fold-away handle for carrying and measures 12½ in. wide, 24½ in. deep and 4½ in. high. It accommodates the standard 24 in. plan width by practically any length; a 30 in. size is also available.

Plan Hold Corp., South Gate, Calif.

For more details circle 170 on Enclosed Return Postal Card.

Motorized Scaffolds

A new motorized Scaffold introduced by Athey Products Corporation, transports men and materials then expands to a full-sized working platform as high as 14 ft. 6 in. off the ground.

Called the Moto-Scaffold, the unit moves on rubber tires or can follow rails on automatic guides; it can be moved at speeds up to 20 mph.

Athey Moto-Scaffold

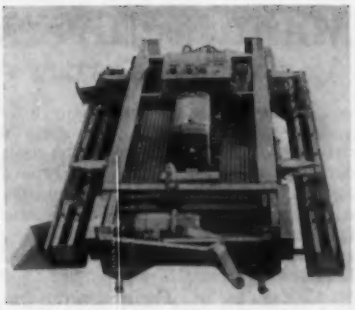
At job site, four stabilizer jacks are lowered, and the main platform is raised hydraulically. Side scaffolds fold out at each side to provide a space 18 ft. 1 in. wide by 14 ft. long. Main platform area has a carrying capacity of 10,000 lb., folding scaffolds each a capacity of 2,000 lb.

Athey Products Corporation, 5631 W. 65th St., Chicago 38, Ill.

For more details circle 171 on Enclosed Return Postal Card.

Gas-Electric Finisher

A new "Flex-Plane" combination, gas-electric finisher is available from Heltzel Steel Form & Iron Company.



New Heltzel Finisher

Two separate gas-electric drives power the drive wheels and screeds. Both machine and screed speed can be adjusted independently for best possible results, the maker reports. The finisher frame extends from 12 to 26 ft. permitting finishing full width slabs as well as ramps and approaches. Float trailer can be supplied as optional equipment. Both screeds and floats are equipped with new, crown change mechanisms.

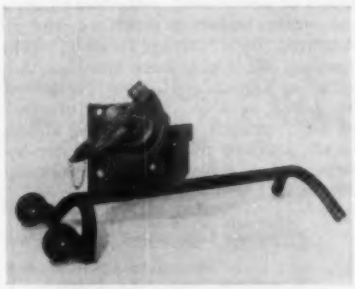
Heltzel Steel Form & Iron Company, Warren, Ohio.

For more details circle 172 on Enclosed Return Postal Card.

Pipe and Conduit Bender

Weight of the Lidseen "Chicago" conduit and pipe benders has been reduced about ⅓ by redesign and the use of high strength steel placed discriminatingly.

This weight reduction, plus a new wheeled stand is said to make the unit conveniently portable. In addition to better stability than previously, the new stand has a provision for leg extensions of 1-in. conduit or pipe so that the benders can now be set at any desired working height. Pawl and pawl release assembly is located for ease of accessability; protected location of control prevents accidental damage, the maker states.



Lidseen "Chicago" Bender

Lidseen of North Carolina, Inc., 1089 First St., Hayesville, N.C.

For more details circle 173 on Enclosed Return Postal Card.

Optical Plummet Transit

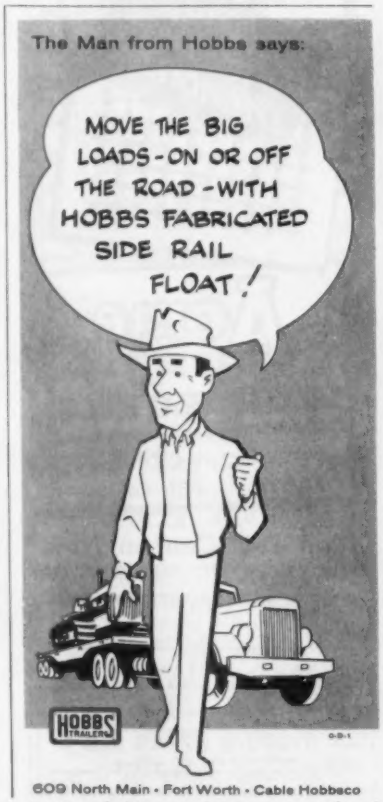
A new optical plummet transit, the "Tropl", which eliminates dependence on the plumb bob when setting up in the wind, has been developed by Fennel Instrument Corporation of America.

Fennel "Tropl" Transit

The optical plummet rotates with the instrument, making it possible to cross check on the point; it focuses for short set-ups or deep sights. The shifting head tripod supplied with the new instrument is said to have twice the usual shifting distance. The tripod screw threads are standard and a locking device on the leveling head can be temporarily lifted to permit standard tripod. The telescope has a reversion bubble, side focusing and a gun sight.

Fennel Instrument Corporation of America, Clifton, N.J.

For more details circle 174 on Enclosed Return Postal Card.



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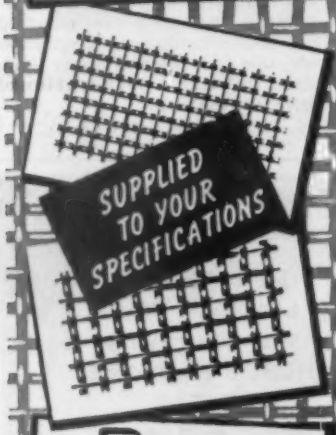

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CITY STATE

Manufacturers' Literature

ASPHALT REPAVER: A new maintenance machine combining all the tools necessary to remold, repair and repave asphalt pavement is announced and described in a brochure from the manufacturer, Cutler Engineering Company, a Division of Asphalt Equipment and Engineering Company, 5435 W. 63rd St., Chicago 38, Ill. The unit is capable of heating, leveling, compacting and remolding existing asphalt pavement. It carries and heats hot mix for patching operations. Full specifications and details are included in the bulletin.

For more details circle 175 on Enclosed Return Postal Card.

DIAMOND DRILLING MACHINES: "New from Truco" is the theme of new literature on diamond drilling machines, diamond drill bits and accessories, Truco concrete, masonry and stone saws and diamond blades. Descriptions and specifications are given for a complete line of drilling and sawing tools and hints on how to reduce drilling costs. Send requests to Truco Masonry Drilling Division, Wheel Trueing Company, 3200 N. Davison, Detroit 38, Mich.

For more details circle 176 on Enclosed Return Postal Card.

PRESTRESS CONCRETE: The basic principles of prestressed concrete and typical applications are described and illustrated in a 56-page booklet from Leschen Wire and Rope Division, Advertising Department, 2727 Hamilton, St. Louis 12, Mo. The manufacture of high-strength, stress-relieved strand in the Leschen plant is shown step-by-step, and a compilation of technical data is included.

For more details circle 177 on Enclosed Return Postal Card.

POISON OAK, POISON IVY FACTS: Description and illustrations regarding poison ivy, poison oak and poison sumac are given along with explanations of where and how these hazards grow in a recent pamphlet published by Syntex Chemical Company, Inc., 10 E. 40th St., New York 16, N.Y. Also included are facts and a report of an actual application test of the company's new tablets made of the same contents used for injections to bring about immunity. The tablets were recently found 95 percent effective, the literature notes, and they are available without prescription.

For more details circle 178 on Enclosed Return Postal Card.

NEW STAR CHARTS: The 1960 Gurley Ephemeris is now available to practicing surveyors and engineers and to instructors and students of surveying. Charts showing Northern, Southern and Equatorial Stars are included and keyed to tables in the publication. The 1960 edition is 92 pages long and includes bound-in charts for simplifying the computation of Polaris. These charts are said to make it possible to determine Polaris quickly and accurately. For copies of the Ephemeris, write W. & L. E. Gurley, Troy, N. Y.

For more details circle 179 on Enclosed Return Postal Card.

19-TON PAYHAULER: A 16-page catalog detailing the features of the 19-ton International Model 65 Payhauler has been issued by International Harvester Company's Construction Equipment Division, 180 N. Michigan Ave., Chicago 1, Ill.

As described in the Literature, rock-ribbed corrugated body of the unit made possible a 5,000-lb. reduction in body weight through the use of strength-tripling steel panels. Power is furnished by the International D-817 six-cylinder diesel engine which develops 250 hp in driving a 10-speed, constant-mesh transmission.

For more details circle 180 on Enclosed Return Postal Card.

THIS IS BETHLEHEM STEEL: An interesting booklet loaded with color photos tells the background and history of Bethlehem Steel Corporation. Various sections deal with the company's general offices and internal operations; 10 pages are devoted to description of the varied Bethlehem plants and their products. A copy can be obtained from the manager of publications at Bethlehem Steel Company, Bethlehem, Pa.

For more details circle 181 on Enclosed Return Postal Card.

Continued on page 238

ROTARY SWEEPER BROOMS
WE MANUFACTURE
• Austin-Western • Cub Low Boy • Int.-Harvester • Purdue • Ferguson • Grace • Gutterslipe • Hough • Huber • Jeep-Willy's
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RE FILLING BUILDING PAIRS
KENNEDY'S
VAN BRUSH MFG. CO.
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FOR SALE

1 20 Ton Lorain Truck Crane, 50' Boom, good rubber, motor rebuilt, Waukesha SRKS upper and lower. Year 1947, excellent condition.
1 20 Ton Lorain Truck Crane, 40' boom, good rubber, motor Waukesha SRKS, year 1949, good condition.
1 Euclid Rear Dump Truck - 1952; model 31TD; 14 cu. yd. capacity, Cummins diesel engine NHRBIS.
8 Plymouth Locomotives model DDT, 10 ton, 30" gauge, 4 wheel, diesel, hydraulic mine type, Hercules model DOOD diesel engine, 79 HP at 2600 RPM, hydraulic converter.
4 Plymouth Locomotives model DDT, 10 ton, 36" gauge, 4 wheel, diesel, hydraulic mine type, Hercules model DOOD diesel engine, 79 HP @ 2600 RPM, hydraulic converter.
2 Sand Dryers, MacLeod Type "B" oil burner which operates with compressed air. 30 cu. ft. sand, dia. 24", top 50", height 64", weight 1350 lbs.
1 48"x12' long Vertical Air Receiver for 125 PSIG.
1 Winslow 23 ton, 3 compartment Binabatch, each compartment having capacity of 7-2/3 tons; 23 cu. ft. weigh hopper with discharge gate - width 7'11," length 14'.

COMPRESSORS

3 Gardner-Denver Dual Compressor Unit model WBJ 4005, capacity 1100 cu. ft., 100 lbs. pressure. 1-250 HP General Electric motor—80% power factor; 3 phase, 60 cycle; 2300 V; 900 RPM; with double standard straight shaft extension, with G.E. magnetic full voltage starting panels.
2 Gardner-Denver Model RP600 Rotary Portable Compressor with General Motors 6-71 diesel motor, on 4 pneumatic tires; delivers 600 CFM at 100 PSI.

GENERATOR PLANTS

2 General Motor Generators—250 KW, 312.5 KVA, 60 cycle, 3 phase, 2300 volts; Exciter volts 125, 19.5 amps excitation, 1800 RPM, model Y1-970.

HOISTS AND DERRICKS

1 250 HP, Single Keyed Drum with electrical equipment. Drum 7'2" dia., grooved for 2" rope, speed 300 RPM, manufactured by Superior—Ledgerwood—Mundy Corp. Motor 250 HP, 2300 volt, 3 phase, 60 cycle. Manufactured by General Electric.
1 Stiff Leg Derrick, 25 ton, 75' boom, 37'4" legs, 2 drum hoist and swingers. Motor 150 HP, 440 volts, 3 phase, 60 cycle, 1160 RPM.
1 Double Drum Hoist and Swingers; motor, 60 HP, 60 cycle, 3 phase, 175 amps, 220 volt, 850 RPM.
1 Double Drum Hoist and Swingers; motor gas, 45 HP, with 500' of cable.

PIPE

100,000 L.F. 6" I.D. #14 gauge Naylor Lockseam Spiralweld steel pipe fitted for Victaulic couplings 30' lengths, 3,500 Victaulic couplings 6".
60,000 L.F. 4" I.D. #14 gauge Naylor Lockseam Spiralweld steel pipe fitted for Victaulic couplings 30' lengths, 2,000 Victaulic couplings 4".
60,000 L.F. 26" I.D. #14 gauge Naylor Lockseam Spiralweld steel vent pipe—30' lths. 2,000 Naylor low pressure wedgelock couplings.

PUMPS

6 I-R 2 Stage Horizontally Split Casing Centrifugal pump, model 3-GT; 600' head, 500 GPM, 3500 RPM, BPH 106.5, weight 1700# flexible coupled to Louis Allis 125 HP motor, 3 phase, 60 cycle, 220/440 volt, dripproof, 5" suction, 3" discharge. Mounted on a common base plate. Manufactured by Ingersoll-Rand Co.
5 LaBour 25W, type DPL, 4" suction, 4" discharge, self-priming centrifugal pump, direct connected to U.S. motor type J; frame U-286; 20 HP, 3 phase, 60 cycle, 220/440 volt, 1800 RPM. Mounted on skid base.
10 LaBour No. 15, DPL, self-priming centrifugal pump, 2" suction, 2" discharge, directly connected to 5 HP 220/400 volt, 3 phase, 60 cycle, 1750 RPM motor, across the line starter.
2 10" IBH 13 stage Bowl, Jackson pump; Fabricated head, equipped with 75 HP, VHS electric motor, 3 phase, 60 cycle, 220/440 volt, 1800 RPM; NRR 400 GPM at 506' TDH.

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50,000 ft. 3 cond. #2/0 5KV mine power feeder cable.
5,000 ft. 3 cond. #4/0 5KV armored bore hole cable.
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Pettibone Speedloaders on rubber tires —load 5 CYM, Road speed to 35 MPH. $3,000
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1 Rex 14S Mixer S. L & Wt. 650.00
1 Jaeger 6S Mixer S, L & Wt. 1,000.00
1 Jaeger Builder Tower & Hoist..... 1000.00
1 Union 3A shooting Hammer 2750.00
1 New Union #1 Pile Hammer 7400.00

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40	012726OH	Water Pump Assy. ICK	5.00
200	68204A-10	Piston Cast Iron FC	1.00
50	140104W	Piston 140, GK Alum.	5.00
200	121104	Piston ICK Cast Iron	.90
20	1401236	Camshaft 140, KG & GZ	30.00
20	121123	Camshaft ICK	10.80
30	145023J	Camshaft 145, GK & GZ	30.00
400	140336	Valve 140 & GZB	3.00
200	145109	Valve Guides 145, GK and GZ	1.00
33	19502-D	Cyl. Head XAH	24.00
30	A145202B	Cyl. Head Assy. w/-valves 145, GK, GZ	80.00
20	114802-A	Cyl. Head BZ	20.00
100	147000C	Head Gaskets 145 & GZ	1.50
30	145011-C	Crankshaft Std. type 140, GK & GZ	80.00
40	121111-E	Crankshaft ICK	20.00
25	19011	Crankshaft XAH	32.00
20	121101A	Block Upper ICK	25.00
4	A0145020H	Block 145	175.00
40	00121207	Con. Rod ICK	4.00
20	009707K	Con. Rod XAH	5.00
400	147605	Oil Ring 145, GZ & GZB	.40
8	0121120	Block Lower ICK	30.00
500	130210B	Con. Rod Bearing 130	.80
400	090870	Lifter Assy. SRKR	.40

HALL-SCOTT V-12 600 HP

6	321682	Crankshaft	$100.00
30	317723	Con. Rod	10.00
3	318872	Cyl. Block Upper	200.00
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12	404396	Manifold Assy. R.H.	50.00
500	319531	Exhaust Valve	1.50
10	323306	Gasket Sets	15.00
40	318927	Head Gasket	4.25
300	307497	Intake Valve	1.50
3	317858	Upper Block	100.00
500	307665	Valve Guide	.30

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400	5065	Push Rod L0525	.90
200	12-66	Con. Rod HP 326	1.60
3	DE-11985	Water Pump 1879	75.00
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15	4005485	Idler Gear L & L0525	5.00
50	5875	Lube Oil Pump K428 and L0525	12.00
40	DE-61475	Liners 844	8.00
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50	2420-0V	Cylinder Liners	30.00
3	BM899	Crankshaft 1190-4	1250.00
20	Complete	Main Bearings (Sets) 20 Under. Set	100.00
20	Complete	Main Bearings (Sets) 40 Under. Set	100.00
20	Complete	Con. Rod (Sets) Std. or 10 Under. Set	60.00
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100	BM5302	Injector Body & Plunger	12.50
2	BM20734	Water Pump LH or RH	75.00
4	BM21739	Cam Shaft LH 10981	400.00
4	8571	Fuel Pump Assy.	100.00

LEROI

400	1A-3-57	Valve Guide 471	$ .20
50	2A13.260-2	Oil Pump 471	5.00

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20	600-08-028	Piston	$180.00
32	60-17-115	Con. Rod Bearing	26.00
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G.M.

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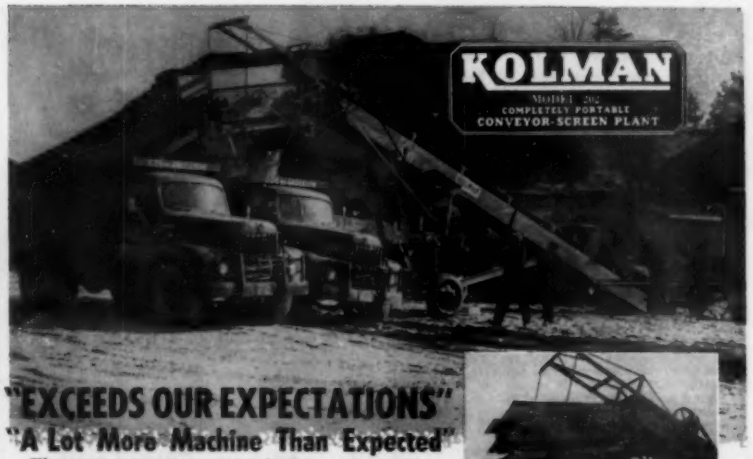

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The Gravity Feed Dozer Trap; illustrated above, and Feeder-Trap Combination with built-in plate feeder are primarily for high speed "push feeding" with bulldozers.

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1 Lima Dragline, 1201 Model, Serial #1284 ..... $19,500.00
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1 Coal Conveyor, 30 Ft. Length... 475.00
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Dismantling One HD-19 A-C Tractor.

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International model TD-18 Cable Dozer (DDPCU) New Tracks. Rebuilt throughout 30 days/150 hours..... $8,500
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20 FT. 1¼" WATER HOSE WITH FITTINGS

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ITEM #472—Contractors Pressure Unit. Consists of stainless steel tank 10 x 15 with Schrader valve, pressure gauge, tire chuck and blow gun. Hundreds of uses. Inflate tires—blow dust from machinery. Wt. 12 lbs.
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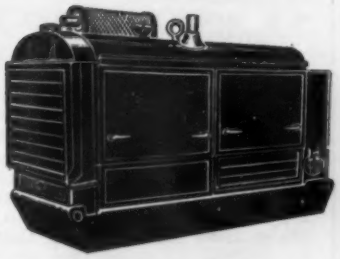

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DRAGLINES, SHOVELS, CRANES, DRILLS, TRUCKS

2400 Lima Elec. Drag, 130', 6 yd.
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4560 Manitowoc Drag, 120', 5 yd.
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1600 P&H 6 Yd. Elec. Shovels
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Marion, Koehring, Link-Belt, Lorain, Lima & P&H long booms, wide long crawlers, diesel powered. In equivalent sizes available.

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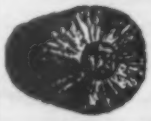

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- 20,000 lbs. single linepull at 75 f.p.m.
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1—Slightly used Euclid Twin Tractor TC12. Latest 6-track roller frame, with dozer and double drum control.

2—Used Model CR LeTourneau 12 yd. scrapers (1949). Cummins diesel engine powered. Exc. condition.

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Rubber tire vulcanized on steel hubs with 2 ball bearings and 4 oil seals mounted on double end shaft with grease fitting at one end—wheel size: 12" diameter, 7¼" wide—shaft diameter approximately 2⅞".

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OUR PRICE IN QUANTITIES **$25.00 Ea.**

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DUAL DRUM PAVER

In Excellent Condition
Ready To Work

Ransome 34E Dual Drum Paver with Hercules HXE gasoline engine, power loader, boom and bucket. With spreading reach of 32½ ft., 60 gallon measuring tank, 800 gallon auxiliary tank with pump, power boom raising, batch meters with counters and full length crawler mounting.

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1—Rex 5 Yd. Mixer, Clean, perfect shape.

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1—Washing Plant, 4 x 10 screen, 30" x 14' screw, 24" x 60 conveyor, 1024 jaw.

3—Elgin Street King Sweepers.

2—Elgin D81 Street Sweepers.

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ASPHALT PLANT

Complete 2000# Batch Type all electric asphalt plant with 35 c.y. material bin and 4 compartment hot aggregate bins—Apron feeder—2 dryers (21' x 50" and 24' x 60") —Hot elevator 3 x 6 Heavy Duty Vibrating Screen totally enclosed—Toledo Dial Type aggregate scale—Dust elevator and screw conveyor—2000# steam jacketed pugmill —75 HP Steam Boiler with Hopkins Low Pressure Oil Burners—Viking Asphalt Pump—10,000 gal. Asphalt and 10,000 gal. Fuel Oil Tanks.

Plant is powered by electric motors and completely wired.

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Designed for 50' O.A.L. &
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Cranes
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New - Used, Excellent Condition - Available Now

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Bucyrus-Erie 22B, ¾ yd. Camel Back, new.
Marion 372, New, 2 yd. machines, will fit other 1½ yd. to 2 yd. machines.
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P&H 255A, ¾ yard. New Camel Back.
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Bucyrus-Erie 15B, 30 ft. New.
Bucyrus-Erie 22B - 35'.
Bucyrus-Erie 22B, 20' Sections - New.
Koehring 304. Excellent
Lima 1201 - 15'; Jib & Mast. New.
Lorain 41, 25'. New.
Lorain 80, 82, 820, New.
NW 25, 25', New.
Osgood 200, 25', New.
Manitowoc 2000B, 45 feet, new, 3000B, 20' jib. New.
Lima 34, 35' Like New.
Lima 604-750, 34, Like New.
Northwest-6, 45', New.
American 375 BC, 35', Like New. Priced to sell. We will adapt to fit other ¾ yard machines.
Link-Belt HC 70, 35' boom. NEW.
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Marion 352, 1¼ yd. 40' boom. NEW.
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P&H 655 - 50'. New.
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Bay City 37, ¾ yd. Good.
Bay City 45, New.
Bay City 65, less bucket. Good.
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Bucyrus-Erie 22-B, ¾ yd. New.
Bucyrus-Erie 37-B, 1½ yd. Good.
Bay City 20, ⅜ yd. Good.
Buckeye 70 and GarWood 20A. New.
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Koehring 701, 2-yd. New.
Koehring 304, with chain, like new.
Lima 604, 1½ yd. Good.
Lima 34, ⅜ yd. New.
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Lorain 820, 2½ yd. Complete, like new.
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In Various Lengths - Inquire
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GarWood M20A, M20B.
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Lima 603, 604, 802.
Link-Belt LS-75, LS-85, LS-90.
Link-Belt K-360, K-370.
Lorain TL25, 77, 79, 80, 820.
Manitowoc 2000B, 3000B.
Marion 362, 372.
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Unit 1020.
Wayne 40.
P&H, all models.
NW 25, 6, 71, 8.

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1— 5,000 Gal.
1— 3,000 Gal.

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1—Noble 500 Ton Model CA-506 Concrete Dry Batching Plant
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8000'—Blaw Knox 14" x 18" Reversible Airport Paving Forms
6000'—Blaw Knox 14" x 14" Non Reversible Airport Paving Forms
1—LeTourneau 20 Ton Derrick—Model M-20
1—Southwest Model HCR-4 Compactor Roller, 50 Ton
1—Bros Model 450 Compaction Roller, 50 Ton
1—Ferguson Model 400A Compaction Roller, 200 Ton
2—Rex 160 Single Pumpcretes—25 HP Electric
1—Telesmith Hercules Washing Screen—60" x 19'
1—Symons Norberg Rod Deck Screen—5' x 10'—10 HP—220/440V
1—Joy 600 CFM Portable Compressor, Model DBMS-1—Diesel
1—Joy Challenger Drill, TWM5—TM 500
2—Fairbanks-Morse 8" Centrifugal Pumps—200 HP—220/440V
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1—Allis-Chalmers Model HD11 equipped w/8 ft. Inside Dozer & Model F Carco Winch, New Rails, Rollers, Rebuilt Idlers. Tractor Perfect. Cleaned and Painted.
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1940 Ford with 700 ga. Tank, ticket printing meter, Electric Reel with 125 ft. of 1¼" hose. $540.00.
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9 B 2295	Bushings	$ 4.00 ea.
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3 H 6002	Piston Assembly	15.00 ea.
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7 B 167	Race	4.00 ea.
9 F 2324	Rod	40.00 ea.

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70206	Brake Drum	$65.00 ea.
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P & H

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915 T 16	Cylinder Assembly	6.50 ea.
915 N 124	Compensator Assem.	7.50 ea.
915 N 130	Compensator Assem.	7.50 ea.
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12 N 214	Cutter "L"	20.00 ea.

KOEHRING

236 D 232	Water Balance Valve (Mixer 115 & 165)	$20.00 ea.
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DITCHER—MODEL 44C

Barber-Greene Vertical Boom 18 ft. Cutting 24". Weight 11 ton. Located in our yard.

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Model G-320C
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Trailers—Low-Boys Any Size up to 60, ton. Send pictures, price first. 3 axle type, too.

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Experienced Equipment For Sale

1—Insley Model K dragline mounted on rubber
1—T-35 Schield-Bantam with backhoe—Reconditioned
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2—60" Sheepsfoot Rollers
1—Cat D-4 Dozer—Complete overhaul
1—Tarco SS-7½ Scotchman Salt Spreader—Demonstrator
1—Cleaver-Brooks Mdl. PSME-50 Portable Steamer—Reconditioned
1—Single Axle Low Boy Trailer—Heavy Duty—Good condition
1—B.G. Conveyor—30"x50'—IHC Watercool Eng.—Trap-Kolman SB70 Screen
1—Goodroad Model 12 Chip Spreader
1—LeT. Model TE Winch with TD-18 adaptor
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1—Northwest model 25 ¾ yd. backhoe, 1954.
2—LaPlant-Choate 15 yard scrapers, large tires, real bargain.
All above in good condition, ready for work. Give good price for the lot.

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Motors Just Overhauled
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Tractor Shovel, $6,500

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TRACTORS & LOADERS
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With Backhoes
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(2) Ferguson
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With Davis Loaders and Backhoes
Each, $3,250 and Up

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TRUCK
Mounted Backhoe, complete with Chevy Truck & Backhoe
$3,000

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MICHIGAN 175AD, S/N 19036, 1958 model, Waukesha Diesel Engine, 2¾ yd. Bucket, very low hours. Excellent Condition $17,000.00
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TRACTOMOTIVE TL-10C, Allis-Chalmers Gasoline Engine, Converter, 1 yard Bucket, recapped tires, Mechanically A-1 .....$ 3,250.00
SCOOPMOBILE "C" equipped with Gasoline Engine, Cab, Hydraulically operated folding tower, lights, 1 yard Bucket, power steering, used very little .....$ 2,750.00
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Any Length, Width or Built to Specifications

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FLUKER, LOUISIANA

BPR's Latest Figures on "I" Program

Construction contracts have been completed on 5,997 miles of the National System of Interstate and Defense Highways at a cost of $2.51 billion, since July 1, 1956, according to the Bureau of Public Roads. As of March 31, 1960, construction was under way on 4,805 miles at an estimated cost of $3.04 billion.

Included in the program were 4,951 bridges completed and 4,900 in progress. In addition, $2.35 billion had been authorized or spent for preliminary engineering work and acquisition of right-of-way for "I" projects since July 1, 1956.

Initial construction contracts on projects involving 183 miles of the Interstate System, including 185 bridges, were awarded during March, 1960, with an estimated cost of $135 million.

Preliminary engineering worth $11 million and right-of-way acquisition estimated to cost $76 million were also authorized during the month. Construction contracts were completed in March on 60 miles, including 91 bridges, at a cost of $47 million.

Manufacturers' Literature

SCREED ATTACHMENT: A screed attachment for concrete paving spreaders that eliminates the need for an extra finisher is described in a bulletin now available from the Blaw-Knox Company, Sales Promotion Dept., Mattoon, Ill. The bulletin, SD-125, describes one particular job on which the Model 5M attachment was used to increase production and reduce maintenance and related costs.

For more details circle 182 on Enclosed Return Postal Card.

ELECTRONIC SURVEYING: An illustrated brochure describng the pinciples of precise distance measurement with micro-waves. General explanation of Tellurometer System for determining length of lines 500 ft. to 40 miles in length, and practical applications for highway, pipeline and transmission line traverse, for trilateration and for offshore positioning of oil rigs, construction projects, and dredges.

Includes description of new model MRA-2, Micro-Distancer, completely re-designed system, built around interchangeable units. New model, also has built-in transistorized power pack, replacing separate accessory. Weight has been reduced by 20 percent and separate carrying case eliminated. May be obtained from Tellurometer, Inc., 206 Dupont Circle Building, Washington 6, D. C. Ask for Bulletin 31-A.

For more details circle 183 on Enclosed Return Postal Card.

NEW A-C LITERATURE: Four new pieces of literature covering the Allis-Chalmers line of construction machinery are now available for the firm's Construction Machinery Division, Milwaukee, Wis.

Literature available is: 1. 20-page catalog covering the 340 hp, 30 yd. heaped, TS-360 Motor Scraper. 2. 4-page illustrated story of the A-C D-10 and D-12 utility tractors. 3. 16-page catalog covering the Model D Motor Grader, its attachments and accessories. 4. An 8-page color catalog highlighting the TS-160 Motor Scrapers.

For more details circle 184 on Enclosed Return Postal Card.

HIGH-FLAT TRAILERS: A 50,000 lb. high-flat capacity trailer is described and specified in a four-page bulletin from Rogers Bros. Corp., Albion, Pa. Fabricated from high tensile steel, the trailer features wheel suspension of lightweight design. Frame is built from structural steel members with full width cross members piercing the main beams; pressed and rolled sections are eliminated. Also described and illustrated are special extendible high-flat trailers; frame length is legal 35 ft. closed and 5 ft. extended. It can also be locked in a 45 ft. intermediate position.

For more details circle 185 on Enclosed Return Postal Card.

TRIPLE AXLE LOW BOYS: New literature containing information and specifications of the Model GTY Axle Low Boy Trailers is available from the manufacturer, Transport Trailers, Inc., 1200-34 12th St., SW., Cedar Rapids, Iowa. The unit features a specially engineered triple-axle arrangement for positive load equalization on all wheels. They are available with 20 in. wheels and range in capacity from 30 ton to 60 ton. Complete details are available in the publication.

For more details circle 186 on Enclosed Return Postal Card.

CONVERTIBLE MOBILE CRANE: A new 12-page catalog gives full information about the improved 15-ton Unit Model 357 Mobile Crane, which is easily converted to a ⅝ yd. clamshell or dragline. Features include two-pin adjustable, double-telescope outriggers, full hydraulic steering, one-piece turntable gear and roller path; twin hook rollers and powerful air brakes on all wheels. Booklet gives full specifications and can be obtained by writing to the Unit Crane & Shovel Corp., Milwaukee, Wis.

For more details circle 187 on Enclosed Return Postal Card.

MOBILE WELDING UNIT: A four-page folder describing the International TD-15-500-1 Paywelder has been issued by International Harvester Company, 180 N. Michigan Ave., Chicago 1, Ill. The rig carries two 325-amp. dual welders with four leads, constituting a compact 120-hp package capable of efficiently pushing through swamps and mountainous terrain, the maker states. High clearance heavy-duty drawbar has been designed for the unit for use under extremely muddy conditions. Request Folder CR-687-K).

For more details circle 188 on Enclosed Return Postal Card.

HAND TORCHES FOR GAS WELDING: Airco Company International has issued a newly revised 36 page catalog on its line of gas welding and cutting hand torches, outfits, tips and accessories. The company's complete group of equipment is covered in detail with general descriptions, features, specifications and photographs given for each product. Also included are specification charts on Airco welding and cutting tips listing all pertinent information that a user might need to make the

proper selection for both general purpose and special gas welding and cutting. Write Airco Company International, a division of Air Reducation Company, Inc., 150 East 42nd Street, New York 17, N. Y. specify Form ADC 702E.

For more details circle 189 on Enclosed Return Postal Card.

RENTAL OF STEEL SHEET PILING: A new 24-page catalog on steel sheet piling is available from L. B. Foster Company, P. O. Box 1647, Pittsburgh 30, Pa. It discusses advantages of renting sheet piling, illustrates typical applications, and details standard, rolled and fabricated sections. Catalog 400 illustrates typical pile arrangements for rectangular and circular cofferdams, and lists nominal lengths of straight walls and dimensions of pile cells. Special sections describe lightweight sheet piling. H-bearing pile, Foster rail pile, pipe pile and accessories.

For more details circle 190 on Enclosed Return Postal Card.

ROLLER BEARINGS: The new line of highest capacity spherical roller bearings from Link-Belt Company, Prudential Plaza, Chicago 1, Illinois, is described in complete detail in its comprehensive new 52-page Book No. 2760. The new bearings are reported to combine three features: maximum diameter and quantity of convex rollers for each bearing size: precision machined centrifugally-cast bronze retainers and high, heavy inner race shoulders.

For more details circle 191 on Enclosed Return Postal Card.

LEAK TESTING OF TANKS, PIPING AND OTHER ENCLOSURES: No. GET-2936, a six page bulletin from the News Bureau of General Electric Co., Schenectady 5, N. Y., gives detailed instructions on use of halogen leak detectors for finding leaks in enclosures that can be pressurized. Applications discussed include hydraulic systems, piping, transformers, and others. Included is a discussion of system preparation, testing procedures, quantitative measurement techniques, and calibration.

For more details circle 192 on Enclosed Return Postal Card.

STATIONARY COMPRESSORS: A new bulletin, E-269, describing its line of industrial rotary stationary compressors, is announced by Davey Compressor Co., Kent, Ohio. Contents include specifications for compressors of 20 to 125 hp. Features listed include "Perma-Vane" long life rotor blades, quietness of operation, freedom from vibration and ease of installation. Units are offered with both air-cooled and water-cooled oil coolers.

For more details circle 193 on Enclosed Return Postal Card.

GRATINGS, FLOORING AND TREADS: A new 16-page catalog issued by Bordon Metal Products Company, Green Lane, Elizabeth, N. J., gives emphasis to the three basic grating types used in construction. Included are dimensional drawings of more than thirty grating subtypes; eight safeload tables for steel grating, aluminum grating, roadway grating and sidewalk slabs; plus other tables for panel widths, tread widths, floor armor, etc. Various safety treads and nosings are also shown in the catalog as well as detailed instructions for selecting, specifying and ordering grating.

For more details circle 194 on Enclosed Return Postal Card.

Cement Association Makes Field Changes

A new regional office has been formed by the Portland Cement Association to serve cement users in Oklahoma, Arkansas, Louisiana and Texas. With office at Austin, it will be headed by Thomas D. Shiels as central regional manager. Shiels, heretofore district manager at Austin, is succeeded by Ted L. Edwards who has served the area as paving engineer.

A new district office also is announced by PCA at Albuquerque, New Mexico, with Bernard C. Smith district engineer. This office will come under PCA's Rocky Mountain region centered at Denver, with Edward W. Thorson as regional manager. Thorson's former position as district manager goes to Jack Y. Barnes who will serve Colorado and Wyoming out of Denver.

Michigan Publishes New Employe Handbook

The Michigan state highway department has published a new Employe Handbook, first such effort in nearly 20 years. The 32-page booklet, prepared by the personnel division, outlines the department's program and tells employes what is expected of them.

The department also has started an orientation program for new employes in its Lansing headquarters. This includes a two-hour briefing session during the first week and a second two-hour meeting during their third week.

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You can save 50% of replacement cost with Factory Rebuilt Swick-Guth Heads. Swick-Guth restores cracked or worn heads, blocks, transmission cases to a Guaranteed good as new condition by the Controlled Heat Process . . . successfully used for more than a Quarter Century.
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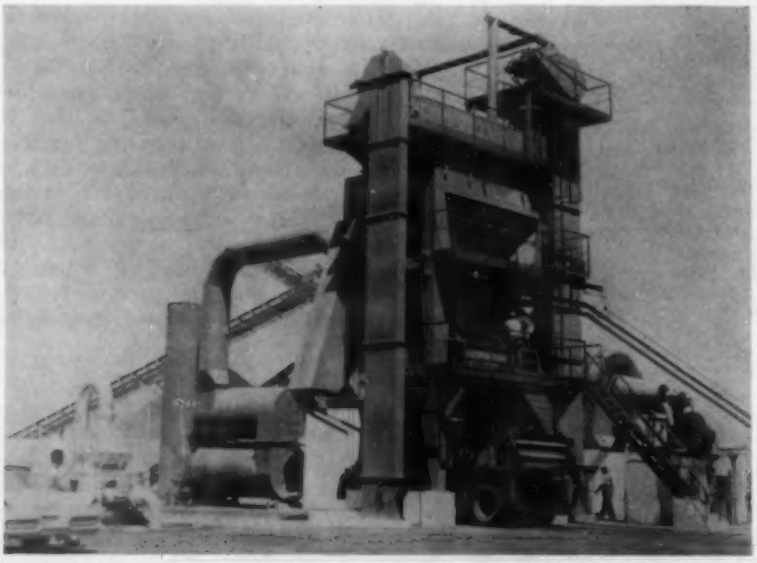
With the Manufacturers' and Distributors



Standard Steel Corporation has begun manufacturing asphalt plants at its recently acquired facility in Lowell, Mass. A typical plant is this Model RM 6000-lb. batch assembly.

"Standard Steel" Opens Eastern Headquarters

Standard Steel Corporation has begun manufacturing asphalt plants at its newly acquired facility in Lowell, Mass., M. B. Preeman, vice president and manager of the firm's road machinery division, has announced. Asphalt plants are now under construction at Lowell for delivery to paving contractors in the East.

Standard Steel Corporation now has asphalt plant manufacturing facilities at three locations: Los Angeles, Calif.; Decatur, Ill.; and Lowell, Mass.

Preeman also announced the appointment of three new exclusive asphalt plant dealers: Hart Equipment Co., Needham, Mass. (Massachusetts, New Hampshire, Vermont, Rhode Island and Northern Connecticut); Equipment and Supplies, Inc., Pittsburgh, Pa. (Western Pennsylvania); Hennessey-Forrestal Machinery Co., St. Louis, Mo. (eastern Missouri and southern Illinois).

W. D. LEASE, executive vice president and director of Athey Products Corporation, Chicago, has been appointed a director of the Construction Industry Manufacturers' Association, according to R. P. McKenrick, CIMA's executive secretary. Lease previously served on the Association's membership committee.

CARL G. HOGBERG has been appointed president of Michigan Limestone Division of United States Steel Corpor-

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Arizona

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ation, it was announced recently by L. B. Worthington, president of the corporation. Hogberg succeeds Christian F. Beukema who was named president of U. S. Steel's Oliver Iron Mining Division.

R. E. Bansemer, general sales manager of the Parsons Company, Division of Koehring Co., Newton, Iowa, has been elected chairman of the Continuous Trenching Equipment Bureau, Construction Industry Manufacturers Association, for 1960. The Bureau was established two years ago.

Announcement of a New Gardner-Denver Company Office in San Diego has been made by the firm's western divisional manager Walt Nilsson, Los Angeles, Calif. Heading the new office will be Robert Scruggs who formerly served as a field engineer for Gardner-Denver in the Los Angeles and San Diego areas.

The Le Roi Division of the Westinghouse Air Brake Company has elevated three men to vice president status, announced Frank J. Zielsdorf, Westinghouse Air Brake vice president and general manager of the division. Those promoted are R. H. Koehler, J. R. Gavigan and L. E. Dondero.

Link-Belt Speeder Corporation, Cedar Rapids, Iowa, has as its new president C. M. Basile, who succeeds D. W. Lehti, retiring after 25 years with the company. Basile has been with Link-Belt since 1928; he has been a director and vice president in charge of operations since 1950.

The American Bitumuls and Asphalt Company announced the appointment of Robert M. Ripple, P. E., as technical service engineer for the Cincinnati district. In this position for Bitumuls, Ripple will cover the four state area of Michigan, Ohio, Indiana and Kentucky.

The International Harvester Company will construct a new motor truck parts depot directly south of the Company's Fort Wayne motor truck engineering department and laboratories. The new buliding will be the company's largest parts distribution facility.

Timken Roller Bearing Company's president, D. A. Bessmer has announced the appointment of R. L. Fredrick to the newly-created position of executive director-international division. Initially, Fredrick will be concerned with manufacturing in overseas locations. He will report to H. E. Markley, vice president.

Skillful Blasting Saves Truck Mixer Drum

By William F. Hallstead

In the Baltimore area not long ago, a chain of circumstances led to one of the most unusual uses of dynamite this writer has come across to date. It began when a Reo transit-mix concrete truck was driven along an embankment at a Baltimore housing development construction site. The bank collapsed. The truck remained upright, but at a precarious angle. To prevent it from possibly toppling over, the operator stopped the barrel's rotation.

By the time the truck was pulled from the collapsed fill, the concrete had set up. Work with a chipping hammer began as soon as the vehicle arrived at the contractor's equipment yard. In seven days, the pneumatic hammer had removed only half of the concrete. In the process, several holes had been punched through the steel drum. At this point, the now desperate owner called a Baltimore blasting firm nationally known for the efficient use of explosives in tight spots.

Thy don't get much tighter than this, but Burnbrae, Inc., quickly dispatched one of its specialists to the equipment yard. He drilled some dozen 1½ in. holes, terminating each about 2 in. from the drum shell. The bore holes were each loaded with ⅛ stick of 40 percent gelatin, and primed with instant caps.

The charges were fired with a DuPont Twist Blasting Machine. Most firings were a single loading only, though several were comprised of 2 and 3 charges.

In half of a working day, the remaining hardened concrete was dynamited loose. It came out in chunks small enough to lift through the side port, and in smaller rubble that emptied through the rear opening of the barrel. Damage to truck as a result of internal blasting: none. Cost of this imaginative, unusual blasting: no more than the cost of repairs necessitated by the abortive chipping operation.

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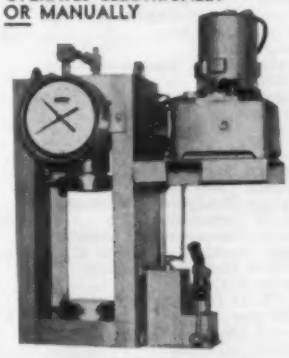

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